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1991

Traffic Collisions in Washington State

Data
Summary and
Problem
Analysis

July 1992

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Introduction

The Data Summary and Problem Analysis is a yearly publication which documents and analyzes traffic impact problems in the State of Washington. This 1991 edition outlines factors that contribute to the occurrence of traffic collisions and the resultant fatalities, injuries and property damage.

The analysis of impact problems gives traffic safety program specialists the information needed to design more effective countermeasures. Programs currently implemented are outlined in the Highway Safety Plan published by the Washington Traffic Safety Commission.

Data is grouped into traffic safety problem areas deemed responsible for the majority of traffic collisions. Current year's data is compared to that of recent years for trend identification. Over/under-representation ratios are used to compare collision involvement of various groups relative to their percentage of the population.

Sources of data reported in this document include traffic collision records (Washington State Patrol), the Fatal Accident Reporting System (Washington Traffic Safety Commission), driver's licensing records (Department of Licensing), vehicle registration records (Department of Licensing), highway/roadway information (Washington State Department of Transportation), and population data (Office of Financial Management).

The facilities of the Traffic Record Data Center at the Washington Traffic Safety Commission have been used to prepare this document.

I. Overview

Six hundred and eighty three (683) persons were killed in 603 fatal traffic collisions in the state of Washington during 1991. This was a 17.2% decrease in traffic deaths from the previous year and a 14.1% decrease compared to the previous 4-year average (1987-1990). A total of 72,004 persons were injured in 1991, down 5.3% from the previous year and down 0.7% from the previous 4-year average. Disabling injuries decreased 10.6% from 1990 and 15.9% from the previous 4-year average. Non-disabling injuries were also down from the previous year and from the previous 4-year average (-5.9% and -8.2% respectively). Property-damage-only collisions recorded a 9.5% reduction from 1990 and a 7.6% reduction from the previous 4-year average. The estimated economic loss for 1991 has been computed at $1,130.0 million. This is a 14.0% decrease from the previous year, but it represents a 20.1% increase from the previous 4-year average (Table 1-1).

There were 121,686 reported collisions in 1991, down 10,370 or 7.9% from 1990, and down 5.2% from the previous 4-year average. Estimated motor vehicle travel for 1991 reached an all-time high of 45,663 million miles of travel, up 3.4% from 1990, and up 9.30% from the previous 4-year average. The 1991 motor vehicle traffic death rate was 1.50 per 100 million vehicle miles traveled, down 19.8% from the 1.87 rate for 1990 and down 18.1% from the previous 4-year average (Table 1-1).

Table 1-1: Severity of collisions
Four-year comparison

severity	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
Total collisions	121,686	132,056	128,800	125,920	126,807	128,396	-5.2%
Motor veh. travel*	45,663	44,157	42,696	41,698	38,520	41,768	9.3%
Fatal collisions	603	726	694	706	699	706	-14.6%
Persons killed	683	825	781	785	790	795	-14.1%
Death rate**	1.50	1.87	1.83	1.88	2.05	1.83	-18.1%
Injury collisions	49,048	51,713	50,747	49,482	46,968	49,728	-1.4%
Persons injured	72,004	76,064	73,993	72,449	67,665	72,543	-0.7%
Disabling Injury	6,839	7,653	8,044	8,318	8,506	8,130	-15.9%
Non-disabling	24,212	25,722	26,974	26,496	26,328	26,380	-8.2%
Possible injury	40,953	42,689	38,974	37,635	32,831	38,032	7.7%
Injury rate**	157.69	172.26	173.30	173.75	175.66	170.53	-7.5%
Property dmg only+	72,035	79,617	77,359	75,732	79,140	77,962	-7.6%
Economic loss++	$1,130	$1,146	$922	$877	$820	$941	20.1%

Source: WSP, Nat'l Safety Council

* In millions of miles

**Deaths/injuries per 100 million vehicle miles of travel.

\+ Oct. 1, 1987 the reporting level for property-damage-only motor vehicle collisions increased from $300 to $500, creating a 4.3% reduction in 1988.

\+ + In millions of dollars.

Exposure

Increases were recorded in all motor vehicle exposure data for 1991. Motor vehicle travel increased 3.4%, motor vehicle registration was up 3.4%, the number of licensed drivers was up 6.1%, and the state's population was up 2.7% compared to 1990 (Table 1-2).

Table 1-2: Exposure - travel, vehicles, drivers and population
Five-year comparison

exposure	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
Motor vehicle travel*	45,663	44,157	42,696	41,698	38,520	41,768	9.3%
Motor veh. registration	4,381,757	4,233,854	4,084,367	3,896,828	3,833,058	4,012,027	9.2%
Licensed drivers	3,572,038	3,366,146	3,350,324	3,264,065	3,156,600	3,284,284	8.8%
State's population	5,000,400	4,866,692	4,660,700	4,565,000	4,481,100	4,643,373	7.7%

*In millions of miles

Source: WSDOT, DOL, OFM

Status of persons killed

More than one-half of all persons killed in traffic crashes (excluding motorcyclists) were the drivers (380 drivers killed out of 683 total fatalities). Passengers made up the next largest segment with 25.8%, followed by pedestrians with 11.6% and motorcyclists with 6.3%. Pedalcyclists recorded a substantial reduction from the previous 4-year average, but accounted for only .08% of all traffic fatalities (Table 1-3).

Table 1-3: Status of persons killed
Five-year comparison

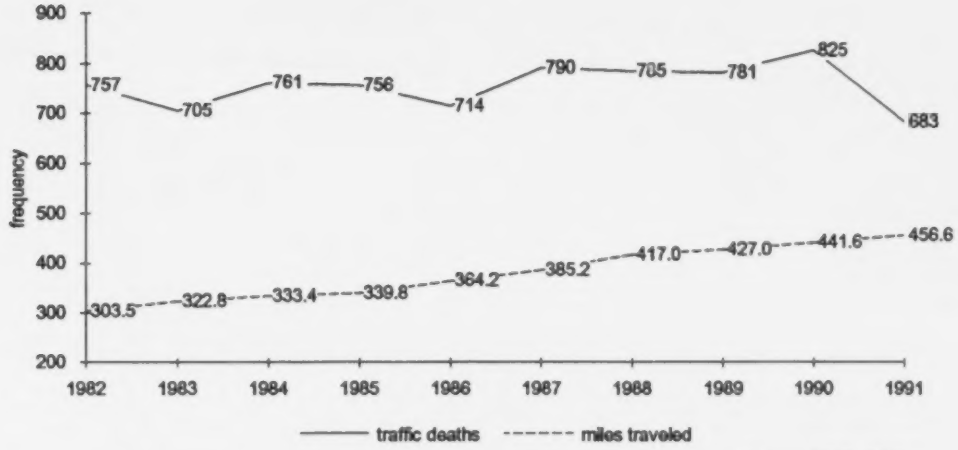
status	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
Drivers (no motorcyclists)	380	438	420	394	386	410	-7.2%
Passengers	176	232	174	206	204	204	-13.7%
Pedestrians	79	81	110	97	93	95	-17.1%
Motorcyclists	43	60	69	76	89	74	-41.5%
Pedalcyclists	5	14	8	12	18	13	-61.5%
Total	683	825	781	785	790	795	-14.1%

Source: WSP

Traffic deaths, injuries, and rates

Figures 1-1 through 1-3 depict trends for traffic deaths, miles traveled, death rates and reported collisions and injuries over the past ten years. Motor vehicle travel has increased steadily over the past decade, with record high mileage in 1991 (an increase of 50.4% from 1982). By contrast, the total number of deaths recorded in 1991 was the lowest in a decade (Figure 1-1).

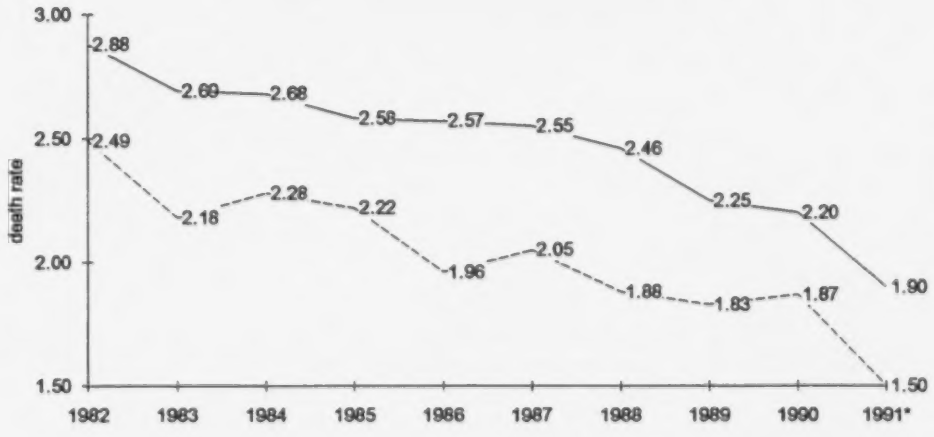
Figure 1-1: **Traffic deaths and miles traveled (in 100 millions)**
Ten-year comparison



Source: WSP, DOT

Washington's 1991 death rate (deaths per 100 million vehicle miles traveled) was a record low 1.50, down 39.8% from the 2.49 rate recorded in 1982. Washington's rate has been consistently lower than the national rate (Figure 1-2).

Figure 1-2: **Death rate (deaths per 100 million vehicle miles)**
Ten-year comparison - Washington vs U.S.

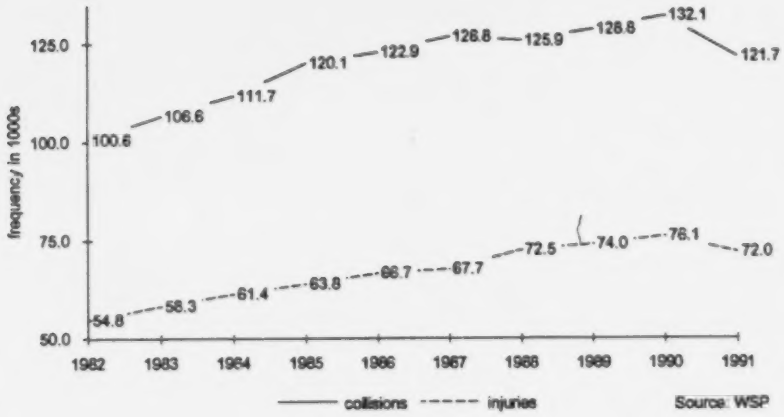


* U.S. figure preliminary for 1991

Source: WSP,
Nat'l Safety Council

Traffic collisions and injuries both recorded decreases in 1991 compared to the previous year. This reversed a long-term trend of increases in both collisions and injuries (Figure 1-3).

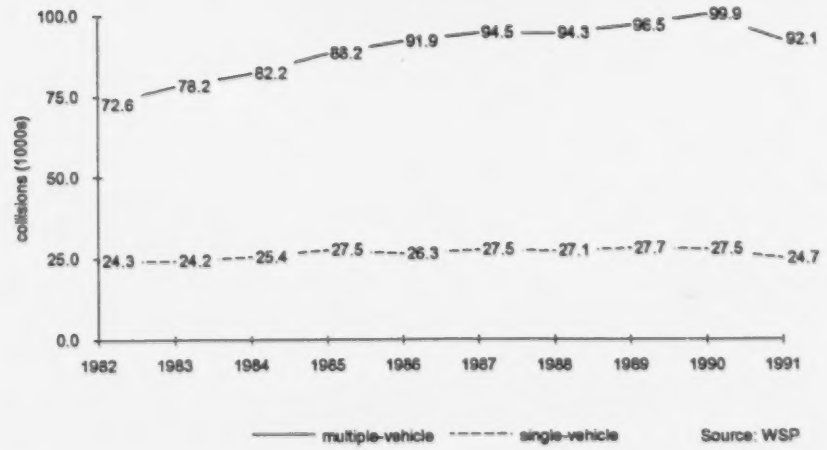
Figure 1-3: Reported collisions & injuries
Ten-year comparison - in 1000s



Single- and multiple-vehicle collisions

The number of multiple vehicle collisions decreased in 1991 after increasing each year since 1982. The number of single-vehicle collisions also decreased from the previous year (Figure 1-4).

Figure 1-4: Single and multiple vehicle collisions
Ten-year comparison - in 1000s



Traffic safety statistics: 1972 to 1991

Exposure statistics, including total licensed drivers, population, vehicle registration and travel, have all increased annually (average increases have been 1% to 5%). Motor vehicle collision and injury totals have followed a similar pattern with the exception of 1991 where both total collisions and injuries recorded a decrease from the previous year. The annual traffic death total ranged from a low of 683 deaths recorded in 1991 to a high of 1,034 recorded in 1979. The fatality death rate (deaths per 100 million miles of travel) has decreased over the years, recording a high rate of 3.82 in 1972 and a low rate of 1.50 in 1991 (Table 1-4).

Table 1-4: Population, vehicle and collision summary
1972 - 1991

year	population	lic. drivers	reg. vehicles	miles drvn*	collisions**	injuries	deaths+	death rate++
1972	3,418,800	2,011,893	2,315,310	22,363	101,002	55,454	855	3.82
1973	3,424,300	2,113,460	2,453,880	23,457	105,515	58,039	778	3.31
1974	3,448,100	2,122,131	2,545,975	22,585	106,242	57,716	761	3.37
1975	3,493,990	2,176,505	2,640,944	24,023	120,635	64,145	771	3.21
1976	3,571,591	2,324,697	2,785,500	25,932	120,864	66,309	825	3.18
1977	3,661,975	2,339,215	2,952,383	27,449	119,058	71,356	927	3.38
1978	3,774,300	2,485,248	3,042,265	29,378	116,923	64,669	1,006	3.42
1979	3,911,200	2,579,368	3,186,898	29,122	118,686	65,399	1,034	3.55
1980	4,132,353	2,662,659	3,293,065	28,696	113,751	61,532	985	3.43
1981	4,250,200	2,732,722	3,408,871	30,346	111,993	61,083	872	2.87
1982	4,264,000	2,774,212	3,313,348	30,353	100,644	54,789	757	2.49
1983	4,285,100	2,867,032	3,372,966	32,275	106,597	58,317	705	2.18
1984	4,328,100	2,973,468	3,459,772	33,344	111,655	61,366	761	2.28
1985	4,384,100	2,980,717	3,546,152	33,978	120,056	63,806	758	2.22
1986	4,419,700	3,029,375	3,651,102	36,416	122,918	66,707	714	1.96
1987	4,481,100	3,156,600	3,833,058	38,520	126,807	67,665	790	2.05
1988	4,565,000	3,264,065	3,896,828	41,698	125,920	72,449	785	1.88
1989	4,660,700	3,350,324	4,084,367	42,696	128,800	73,993	781	1.83
1990	4,866,692	3,366,146	4,233,853	44,157	132,056	76,064	825	1.87
1991	5,000,400	3,572,038	4,381,757	45,663	121,686	72,004	683	1.50

Source: WSP, OFM, DOL, WSDOT

* In millions, estimated for 1991

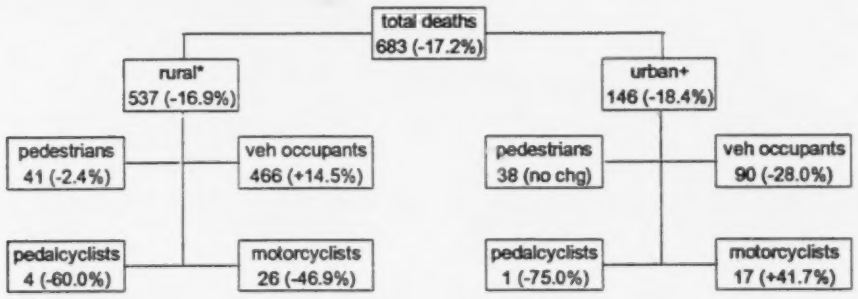
** Minimum damage for a reportable collision was increased from $100 to $300 to the property of one person on 7/1/77 and to $500 on 10/1/87.

\+ State adopted a 90-day fatal-reporting policy in 1980 and a 30-day fatal-reporting policy in 1989.

\+ \+ Traffic deaths per 100 million vehicle miles of travel.

Of the 683 traffic deaths in 1991, 537 occurred in rural areas of the state, while 146 occurred in urban areas (cities with a population of 2,500 or greater). Both areas recorded decreases from the previous year, with rural areas recording a 16.9% decrease and urban areas recording an 18.4% decrease (Figure 1-5).

Figure 1-5: Urban vs rural traffic fatalities by type - 1991
Percent of change from previous year

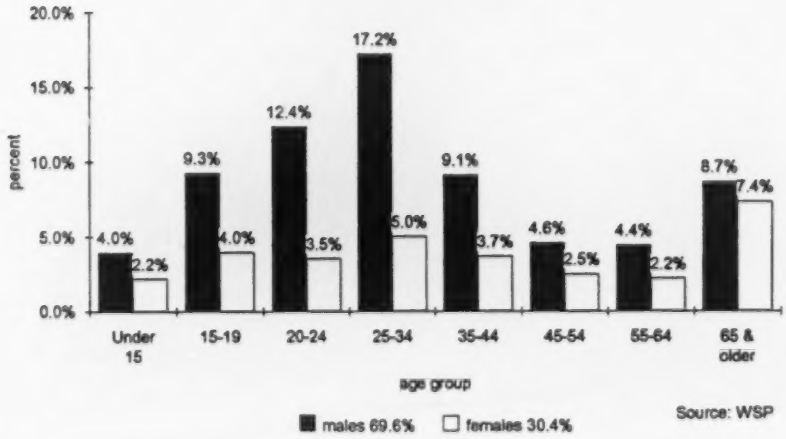


* Rural: Unincorporated areas plus incorporated areas with population less than 2,500. Source: WSP
\+ Urban: Cities with population 2,500 and greater.

Age and sex of persons killed

The majority of traffic fatalities were males (69.6%). For males, the age group with the most traffic fatalities was 25-34 with 17.2% of the total fatalities. For females, the age group with the most fatalities was the 65 and older, with 7.4% of the total (Figure 1-6).

Figure 1-6: **Percentage of traffic fatalities By age and sex - 1991**



Source: WSP

Age and status of persons killed and injured

In 1991, 151 persons between the ages of 25-34 were killed in traffic collisions, followed by the 20-24 year group with 108 fatalities. The great majority of persons killed in traffic collisions in all age groups were killed while occupying a motor vehicle. Of pedestrians killed, the highest number was in the 75 and older group with 13 fatalities. The highest number of pedalcyclist injuries occurred in the 10-14 year range, with 385 injured (Table 1-5).

Table 1-5: Persons killed and injured - 1991
By age and by status

	total*		occupants +		pedestrians		pedalcyclists	
age	killed	injured	killed	injured	killed	injured	killed	injured
0 - 4	11	1,466	9	1,319	2	113	0	32
5 - 9	13	1,987	7	1,536	6	217	0	232
10 - 14	18	2,433	10	1,829	7	218	1	385
15 - 19	90	10,203	82	9,828	8	193	0	181
20 - 24	108	11,106	103	10,709	3	186	1	206
25 - 34	151	16,559	139	16,069	11	267	1	216
35 - 44	87	12,074	79	11,707	8	263	0	97
45 - 54	48	6,352	43	6,196	5	121	0	34
55 - 64	45	3,517	37	3,398	7	96	1	19
65 - 74	54	2,585	44	2,493	9	76	1	16
75/older	55	1,588	42	1,494	13	89	0	5
Not stated	3	2,133	3	2,019	0	72	0	40
Total	683	72,003	598	68,597	79	1,911	5	1,463

Source: WSP

* Total killed includes 1 where the status of the person killed was unknown.
Total injured includes 32 where the status of the person injured was unknown.
+ Includes motorcyclists

Traffic death occurrences by month

During 1991, the months recording the greatest number of traffic deaths were August and September, recording 73 and 66 deaths respectively. The month of June recorded the biggest reduction from the previous 4-year average (-32.0%), followed by July with a reduction of 27.5% (Table 1-6).

Table 1-6: Traffic deaths by month
Five-year comparison

month	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
January	54	63	42	40	54	50	8.5%
February	49	53	33	42	52	45	8.9%
March	55	61	53	70	62	62	-10.6%
April	47	55	52	55	55	54	-13.4%
May	64	75	74	69	50	67	-4.5%
June	52	82	65	82	77	77	-32.0%
July	58	85	76	86	73	80	-27.5%
August	73	92	72	79	84	82	-10.7%
September	66	80	85	70	90	81	-18.8%
October	62	62	81	66	69	70	-10.5%
November	54	56	71	66	73	67	-18.8%
December	49	61	77	60	51	62	-21.3%
Total	683	825	781	785	790	795	-14.1%

Source: WSP

Traffic collisions by hour of day and day of week

Fifty-one percent of Washington's fatal collisions occurred on the week-end days of Friday, Saturday and Sunday (305 of 603 fatal collisions). Forty-three percent of the total reported collisions (51,806 of 121,686 total collisions) also occurred during the week-end (Table 1-7).

Table 1-7: Collisions by hour and day of week - 1991

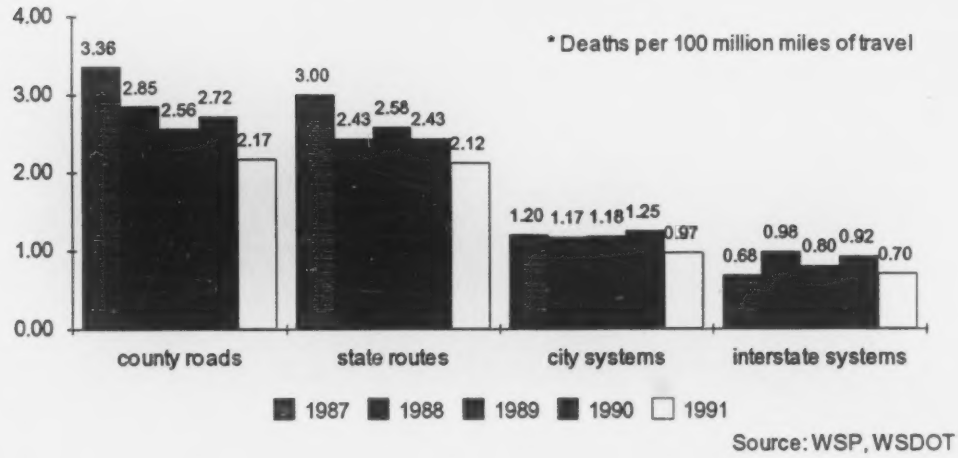
	total week			Monday - Thursday			Friday - Sunday		
hour	total	injury	fatal	total	injury	fatal	total	injury	fatal
midnight	2,806	1,251	27	1,060	521	9	1,746	730	18
1:00 a.m.	2,727	1,265	38	884	485	13	1,843	780	25
2:00 a.m.	2,509	1,162	42	817	429	17	1,692	733	25
3:00 a.m.	1,324	618	18	449	245	5	875	373	13
4:00 a.m.	999	916	13	417	218	4	582	698	9
5:00 a.m.	1,378	611	14	793	374	8	585	237	6
6:00 a.m.	2,786	1,249	15	1,979	931	9	807	318	6
7:00 a.m.	5,460	2,517	22	4,092	1,988	18	1,368	529	4
8:00 a.m.	4,721	2,078	20	3,285	1,517	14	1,436	561	6
9:00 a.m.	4,090	1,729	15	2,579	1,161	5	1,511	568	10
10:00 a.m.	4,890	2,107	15	2,946	1,383	10	1,944	724	5
11:00 a.m.	6,197	2,813	18	3,642	1,813	9	2,555	1,000	9
noon	7,250	3,303	10	4,161	2,042	5	3,089	1,261	5
1:00 p.m.	7,410	3,409	26	4,129	2,061	13	3,281	1,348	13
2:00 p.m.	8,436	4,087	36	4,962	2,642	19	3,474	1,445	17
3:00 p.m.	10,027	4,833	30	6,181	3,220	14	3,846	1,613	16
4:00 p.m.	10,470	5,189	30	6,521	3,571	18	3,949	1,618	12
5:00 p.m.	10,513	5,252	37	6,602	3,611	25	3,911	1,641	12
6:00 p.m.	7,165	3,651	24	4,153	2,359	12	3,012	1,292	12
7:00 p.m.	5,346	2,710	31	2,879	1,641	14	2,467	1,069	17
8:00 p.m.	4,083	2,043	17	2,103	1,211	5	1,980	832	12
9:00 p.m.	4,010	2,041	34	2,078	1,254	22	1,932	787	12
10:00 p.m.	3,609	1,802	31	1,696	1,016	15	1,913	786	16
11:00 p.m.	3,480	1,719	40	1,472	913	15	2,008	806	25
Total	121,686	58,355	603	69,880	36,606	298	51,806	21,749	305

Source: WSP

Traffic collisions & deaths by type of roadway

During 1991, the interstate system recorded the lowest death rate per vehicle miles traveled with 0.70 deaths per 100 million miles. County roads recorded a 2.17 death rate, the highest in the state. City streets had by far the greatest number of total collisions with 55,356, followed by all other state highways with 28,171. The greatest amount of vehicle travel was on all other state highways with an estimated 12,572 million miles (Figure 1-7, Table 1-8).

Figure 1-7: Death rate* by type of highway
Five-year comparison



Source: WSP, WSDOT

Table 1-8: Highways, travel and collisions
By type of highway - 1991

type of highway	highway miles	%	miles + traveled	%	collisions	fatalities	death rate*
Interstate system	771	1.0%	11,322	24.8%	12,505	79	0.70
All other state highways	6,227	7.8%	12,572	27.5%	28,171	267	2.12
County roads	41,519	52.0%	10,802	23.7%	24,742	234	2.17
City streets	11,775	14.7%	9,421	20.6%	55,356	91	0.97
All other traffic ways**	19,612	24.5%	1,546	3.4%	912	12	0.78
Total	79,904	100.0%	45,663	100.0%	121,686	683	1.50

Source: WSP, WSDOT

+ Preliminary estimates in millions
*Fatalities per hundred million vehicle miles, based on roadway travel as reported by WSDOT
**Does not include (all terrain vehicle) trails.

Collisions by age group of driver

Drivers 20 years and under comprised 6.7% of all licensed drivers in the state in 1991, yet this group was involved in 14.4% of the year's fatal collisions and 15.7% of total collisions. This group, therefore, had an over-representation rate of 1.85 in fatal collisions and 2.01 in total collisions. The 21-24 age group comprised 7.8% of total licensed drivers. They were involved in 12.0% of total collisions, producing an over-representation ratio of 1.54. Senior drivers 55 years and older comprised 21.7% of total licensed drivers; they were involved in 14.5% of total collisions, producing an under-representation ratio of 0.67 (Table 1-9).

Table 1-9: Driver distribution and collision involvement
By age group - 1991

age	lic drivers	% of lic dvrs	collisions	% of collisions	ratio* of collisions	fatal clsns	% of fatal clsns	ratio* of fatal clsns
Under 16	-----	-----	576	0.31%	-----	7	0.79%	-----
16	29,217	0.82%	4,192	2.22%	2.72	7	0.79%	0.97
17	43,124	1.21%	5,829	3.09%	2.56	20	2.27%	1.88
18	50,108	1.40%	6,386	3.39%	2.42	32	3.63%	2.59
19	56,960	1.59%	6,336	3.36%	2.11	26	2.95%	1.85
20	61,660	1.73%	6,285	3.33%	1.93	35	3.97%	2.30
21	69,416	1.94%	6,228	3.30%	1.70	32	3.63%	1.87
22	69,248	1.94%	5,716	3.03%	1.56	27	3.06%	1.58
23	70,810	1.98%	5,415	2.87%	1.45	31	3.51%	1.77
24	67,504	1.89%	5,257	2.79%	1.48	20	2.27%	1.20
25-29	390,866	10.94%	25,353	13.45%	1.23	129	14.63%	1.34
30-34	446,309	12.49%	23,771	12.61%	1.01	131	14.85%	1.19
35-39	449,720	12.59%	20,910	11.09%	0.88	75	8.50%	0.68
40-44	410,194	11.48%	17,774	9.43%	0.82	74	8.39%	0.73
45-49	316,620	8.86%	12,490	6.63%	0.75	48	5.44%	0.61
50-54	228,858	6.41%	8,749	4.64%	0.72	38	4.31%	0.67
55-59	186,111	5.21%	6,803	3.61%	0.69	24	2.72%	0.52
60-64	173,736	4.86%	5,762	3.06%	0.63	28	3.17%	0.65
65-69	163,093	4.57%	4,960	2.63%	0.58	19	2.15%	0.47
70 & over	288,484	8.08%	9,712	5.15%	0.64	79	8.96%	1.11

*Over/under ratio of age group in total/fatal collisions

Source: WSP, DOL

Collisions by male/female drivers

Just over half, or 51.9%, of all licensed drivers in 1991 were males. However, males drivers were involved in 76.4% of fatal collisions, creating an over-representation ratio of 1.47. Males were involved in 61.4% of total collisions, and were therefore over-represented by a ratio of 1.18 in that category. Just the reverse was true for females, who were under-represented in both fatal and total collisions (Table 1-10).

Table 1-10: Male and female drivers involved in collisions
Fatal and total - 1991

sex	licensed drivers	%	fatal collisions	%	ratio*	total collisions	%	ratio*
Male	1,853,195	51.9%	676	76.4%	1.47	124,711	61.4%	1.18
Female	1,718,843	48.1%	209	23.6%	0.49	78,494	38.6%	0.80

*Over/under ratio of males/females in fatal/total collisions

Source: WSP, DOL

Collision, death and injury rates based upon county and city populations

Population collision rates ranged from a low of 13.24 (collisions per 1,000 persons) in Island County to a high of 43.58 in Kittitas county. The state-wide collision rate has been computed at 24.34 for 1991 (Table 1-11).

Of cities of 10,000 population and greater, Pullman recorded the lowest collision rate with 10.44 collisions per 1,000 population. The city with the highest collision rate was Tukwila, recording 102.46 collisions per 1,000 population (Table 1-12).

Traffic death and injury rates by county based upon number of registered vehicles

Three counties, Columbia, Garfield and Wahkiakum, recorded zero fatal collisions during 1991. Nine counties recorded lower death rates than the statewide average of 1.56 deaths per 10,000 registered vehicles. Clallam County recorded a death rate of 0.36, based on two traffic deaths; Spokane recorded a 0.84 rate, based on 26 deaths; and King County's rate was 0.91, based on 124 traffic deaths. San Juan, Asotin, and Garfield recorded the lowest injury rates with 61.85, 80.47 and 83.97 injuries per 10,000 registered vehicles (Table 1-13).

Table 1-11: Collisions, deaths and injuries
By county - 1991

county	population	total collisions number	total collisions rate**	deaths number	deaths rate*	injuries number	injuries rate**
Over 1,000,000							
King	1,542,300	44,864	29.09	124	8.04	25,451	16.50
250,000 to 750,000							
Pierce	603,800	14,467	23.96	61	10.10	9,896	16.39
Snohomish	484,000	10,850	22.42	69	14.26	6,724	13.89
Spokane	366,000	8,680	23.72	26	7.10	4,993	13.64
100,000 to 250,000							
Clark	250,300	4,783	19.11	32	12.78	2,982	11.91
Kitsap	196,500	4,006	20.39	27	13.74	2,571	13.08
Yakima	190,500	4,453	23.38	41	21.52	2,686	14.10
Thurston	168,000	3,841	22.86	22	13.10	2,094	12.46
Whatcom	132,200	3,080	23.30	16	12.10	1,716	12.98
Benton	114,800	2,170	18.90	17	14.81	1,148	10.00
50,000 to 100,000							
Cowlitz	83,500	1,975	23.65	13	15.57	1,141	13.66
Skagit	82,800	2,053	24.79	20	24.15	1,271	15.35
Grays Harbor	65,100	1,514	23.26	20	30.72	754	11.58
Island	62,700	830	13.24	5	7.97	579	9.23
Lewis	60,500	1,619	26.76	17	28.10	880	14.55
Clallam	58,500	1,091	18.65	2	3.42	549	9.38
Grant	56,400	1,036	18.37	12	21.28	650	11.52
Chelan	53,200	1,417	26.64	17	31.95	772	14.51
25,000 to 50,000							
Walla Walla	49,300	878	17.81	14	28.40	465	9.43
Mason	39,900	853	21.38	7	17.54	491	12.31
Franklin	38,600	772	20.00	12	31.09	485	12.56
Whitman	38,500	586	15.22	12	31.17	346	8.99
Okanogan	34,000	665	19.56	8	23.53	407	11.97
Stevens	31,500	514	16.32	10	31.75	316	10.03
Douglas	27,500	483	17.56	7	25.45	272	9.89
Kittitas	27,400	1,194	43.58	28	102.19	587	21.42
10,000 to 25,000							
Jefferson	21,600	483	22.36	6	27.78	281	13.01
Pacific	19,200	376	19.58	6	31.25	212	11.04
Asotin	17,800	266	14.94	2	11.24	120	6.74
Klickitat	16,800	350	20.83	4	23.81	216	12.86
Adams	13,800	382	27.68	9	65.22	239	17.32
San Juan	10,700	129	12.06	3	28.04	70	6.54
Under 10,000							
Pend Oreille	9,200	208	22.61	2	21.74	135	14.67
Lincoln	8,900	235	26.40	7	78.65	153	17.19
Skamania	8,500	181	21.29	2	23.53	111	13.06
Ferry	6,500	185	28.46	3	46.15	124	19.08
Columbia	4,000	101	25.25	0	0.00	57	14.25
Wahkiakum	3,300	66	20.00	0	0.00	36	10.91
Garfield	2,300	50	21.74	0	0.00	24	10.43
Total	5,000,400	121,686	24.34	683	13.66	72,004	14.40

Source: WSP, OFM

*Frequency per 100,000 population
**Frequency per 1,000 population

Table 1-12: Collisions, deaths and injuries*
By city population - 1991

city	population	deaths		injuries		total collisions	
		number	rate**	number	rate+	number	rate+
250,000 and over							
Seattle	516,259	29	5.62	11,050	21.40	20,626	39.95
100,000 to 250,000							
Spokane	178,500	6	3.36	3,110	17.42	5,691	31.88
Tacoma	177,500	13	7.32	4,308	24.27	6,330	35.66
50,000 to 100,000							
Bellevue	87,900	1	1.14	1,397	15.89	2,579	29.34
Everett	72,480	12	16.56	1,434	19.78	2,622	36.18
Federal Way	70,660	3	4.25	1,272	18.00	1,960	27.74
Yakima	57,660	4	6.94	1,099	19.06	2,010	34.86
Bellingham	53,100	1	1.88	684	12.88	1,431	26.95
25,000 to 50,000							
Vancouver	47,190	5	10.60	669	14.18	1,329	28.16
Renton	43,000	6	13.95	947	22.02	2,016	46.88
Kennewick	42,773	1	2.34	502	11.74	976	22.82
Kirkland	40,590	2	4.93	594	14.63	1,219	30.03
Kent	39,650	5	12.61	1,198	30.21	1,827	46.08
Redmond	37,460	0	0.00	403	10.76	882	23.55
Bremerton	37,040	2	5.40	666	17.98	1,256	33.91
Olympia	34,850	0	0.00	586	16.81	1,415	40.60
Auburn	33,280	5	15.02	658	19.77	1,170	35.16
Richland	32,740	2	6.11	322	9.84	653	19.95
Longview	31,730	0	0.00	496	15.63	894	28.18
Edmonds	30,850	1	3.24	262	8.49	466	15.11
Lynnwood	29,010	1	3.45	775	26.71	1,401	48.29
Walla Walla	27,020	3	11.10	239	8.85	523	19.36
15,000 to 25,000							
Puyallup	24,450	1	4.09	398	16.28	758	31.00
Pullman	23,090	2	8.66	109	4.72	241	10.44
Sea Tac	22,830	1	4.38	674	29.52	1,097	48.05
Wenatchee	22,080	1	4.53	279	12.64	633	28.67
Mercer Island	21,190	1	4.72	153	7.22	308	14.54
Pasco	20,660	2	9.68	317	15.34	554	26.82
Lacey	20,210	2	9.90	327	16.18	601	29.74
Mountlake Terrace	19,690	0	0.00	222	11.27	378	19.20
Mount Vernon	18,720	3	16.03	227	12.13	476	25.43
Port Angeles	17,890	0	0.00	195	10.90	443	24.76
Oak Harbor	17,890	1	5.59	109	6.09	215	12.02
Des Moines	17,480	0	0.00	132	7.55	236	13.50
Aberdeen	16,660	2	12.00	189	11.34	528	31.69
10,000 to 15,000							
Tukwila	14,630	4	27.34	855	58.44	1,499	102.46
Mukilteo	12,990	0	0.00	87	6.70	154	11.86
Bothell	12,630	1	7.92	164	12.98	271	21.46
Ellensburg	12,570	0	0.00	51	4.06	163	12.97
Centralia	12,210	1	8.19	209	17.12	483	39.56
Kelso	11,800	1	8.47	183	15.51	400	33.90
Anacortes	11,700	1	8.55	90	7.69	164	14.02
Moses Lake	11,420	0	0.00	125	10.95	276	24.17
Sunnyside	11,270	1	8.87	81	7.19	180	15.97
Marysville	10,970	2	18.23	215	19.60	438	39.93
Tumwater	10,360	2	19.31	115	11.10	291	28.09
TOTAL	2,116,632	131	6.19	38,177	18.04	70,063	33.10

Source: WSP, OFM

*Includes collisions occuring on the interstate system
**Frequency per 100,000 population
+Frequency per 1,000 population

Table 1-13: Traffic deaths, injuries and rates*
By county - 1991

county	registered vehicles	deaths	death rate*	injuries	injury rate*
Adams	16,305	9	5.52	239	146.58
Asotin	14,913	2	1.34	120	80.47
Benton	96,929	17	1.75	1,148	118.44
Chelan	55,069	17	3.09	772	140.19
Clallam	56,005	2	0.36	549	98.03
Clark	216,014	32	1.48	2,982	138.05
Columbia	4,571	0	0.00	57	124.70
Cowlitz	78,843	13	1.65	1,141	144.72
Douglas	21,680	7	3.23	272	125.46
Ferry	4,544	3	6.60	124	272.89
Franklin	42,639	12	2.81	485	113.75
Garfield	2,858	0	0.00	24	83.97
Grant	52,991	12	2.26	650	122.66
Grays Harbor	58,204	20	3.44	754	129.54
Island	46,315	5	1.08	579	125.01
Jefferson	19,067	6	3.15	281	147.38
King	1,359,183	124	0.91	25,451	187.25
Kitsap	160,821	27	1.68	2,571	159.87
Kittitas	25,638	28	10.92	587	228.96
Klickitat	16,138	4	2.48	216	133.85
Lewis	62,031	17	2.74	880	141.86
Lincoln	11,413	7	6.13	153	134.06
Mason	36,399	7	1.92	491	134.89
Okanogan	30,623	8	2.61	407	132.91
Pacific	16,740	6	3.58	212	126.64
Pend Oreille	8,342	2	2.40	135	161.83
Pierce	471,334	61	1.29	9,896	209.96
San Juan	11,318	3	2.65	70	61.85
Skagit	86,293	20	2.32	1,271	147.29
Skamania	5,654	2	3.54	111	196.32
Snohomish	433,138	69	1.59	6,724	155.24
Spokane	309,492	26	0.84	4,993	161.33
Stevens	25,462	10	3.93	316	124.11
Thurston	177,755	22	1.24	2,094	117.80
Wahkiakum	2,845	0	0.00	36	126.54
Walla Walla	35,347	14	3.96	465	131.55
Whatcom	116,671	16	1.37	1,716	147.08
Whitman	27,671	12	4.34	346	125.04
Yakima	164,502	41	2.49	2,686	163.28
Total	4,381,757	683	1.56	72,004	164.33

Source: WSP, DOL

* Traffic deaths/injuries per 10,000 registered vehicles

II. Alcohol Involvement

Washington State has experienced a gradual reduction in the number and the seriousness of collisions involving alcohol. However, the problem remains significant in that 49% of all traffic fatalities in 1991 did involve a driver with some level of alcohol-involvement (Table 2-1). Drivers who were determined to be "under the influence" (DWI) were involved in collisions in which 44.5% of the state's total traffic deaths occurred (Table 2-2).

Table 2-1: Alcohol-related* collision summary
Five-year comparison

	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
Total collisions	14,776	15,998	16,061	17,299	17,590	16,737	-11.7%
Number of drinking drivers	15,470	16,760	16,756	18,049	18,292	17,464	-11.4%
Fatal collisions	300	372	344	374	346	359	-16.4%
Injury collisions	8,020	8,667	8,717	8,796	8,748	8,732	-8.2%
Prpty damage only	6,456	6,959	7,000	8,129	8,496	7,646	-15.6%
Persons killed	335	431	392	433	396	413	-18.9%
Percent of all traffic fatalities	49.0%	52.2%	50.1%	55.2%	50.1%	51.9%	-5.6%
Persons injured	12,575	13,749	13,660	13,724	13,555	13,672	-8.0%
Disabling injuries	2,132	2,476	2,595	2,665	2,665	2,600	-18.0%
Non-disabling injuries	5,944	6,486	6,516	6,418	6,573	6,498	-8.5%
Possible injuries	4,499	4,787	4,549	4,641	4,317	4,574	-1.6%

* All drinking drivers, including DWI

Source: WSP

Table 2-2: Collisions involving drivers "under the influence"*
Five-year comparison

status	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
Total collisions	9,237	9,887	9,816	9,463	9,398	9,641	-4.2%
DWI drivers	9,331	9,973	9,901	9,532	9,455	9,715	-4.0%
Fatal collisions	271	320	306	328	292	311	-12.9%
Injury collisions	5,375	5,604	5,622	5,270	5,066	5,391	-0.3%
Prop. damage only**	3,591	3,963	3,888	3,867	4,040	3,940	-8.8%
Persons killed	304	371	353	376	337	359	-15.4%
% of all traffic fatalities	44.5%	45.0%	45.2%	47.9%	42.7%	45.2%	-1.5%
Persons injured:	8,598	9,016	8,898	8,359	7,970	8,561	0.4%
Disabling	1,616	1,801	1,840	1,832	1,788	1,815	-11.0%
Non-disabling	4,203	4,322	4,316	3,986	3,897	4,130	1.8%
Possible injury	2,779	2,893	2,742	2,541	2,285	2,615	6.3%

* DWI drivers only

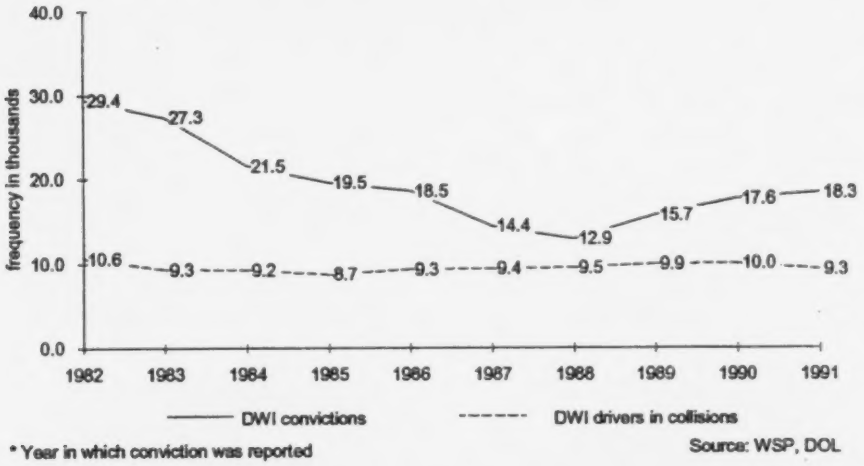
** Minimum damage: $500

Source: WSP

DWI Convictions

DWI convictions increased for the third consecutive year after seven years of decreases. The number of DWI drivers involved in investigated collisions decreased from 9,973 drivers in 1990 to 9,331 in 1991 (Figure 2-1).

Figure 2-1: DWI convictions* & DWI drivers in investigated collisions
Ten-year comparison - in thousands



* Year in which conviction was reported

Source: WSP, DOL

Table 2-3 shows the monthly toll of persons killed and injured in all alcohol-related collisions (including DWI). Table 2-4 shows the numbers of killed and injured when a DWI driver was involved.

Table 2-3: Persons killed & injured in collisions where driver "had been drinking"
Five-year comparisons by month

	persons killed					persons injured				
month	1991	1990	1989	1988	1987	1991	1990	1989	1988	1987
January	23	34	26	18	19	811	1,086	976	866	861
February	26	30	11	28	27	826	889	702	876	849
March	28	37	20	47	31	1,115	1,107	920	1,053	1,061
April	27	31	29	36	31	943	1,046	1,066	1,130	1,110
May	34	39	46	47	32	1,077	1,126	1,196	1,284	1,257
June	26	40	27	50	47	1,059	1,287	1,185	1,133	1,130
July	33	45	42	45	40	1,164	1,229	1,335	1,372	1,266
August	32	41	36	35	46	1,322	1,373	1,202	1,170	1,405
September	36	41	45	38	39	1,085	1,256	1,264	1,173	1,151
October	32	34	43	32	36	1,040	1,152	1,261	1,321	1,194
November	24	30	33	35	31	1,068	1,119	1,292	1,126	1,181
December	14	29	34	22	17	1,065	1,079	1,261	1,220	1,090
Total	335	431	392	433	396	12,575	13,749	13,660	13,724	13,555

Source: WSP

Table 2-4: Persons killed & injured in collisions where driver was "under the influence"
Five-year comparisons by month

	persons killed					persons injured				
month	1991	1990	1989	1988	1987	1991	1990	1989	1988	1987
January	23	31	25	17	16	554	715	617	491	523
February	22	27	11	27	25	546	608	433	554	488
March	28	34	19	42	26	808	725	566	669	617
April	22	28	25	27	24	648	700	689	684	656
May	32	32	42	39	28	744	726	784	785	748
June	21	34	24	47	44	758	850	782	722	662
July	29	38	40	37	29	768	763	864	842	715
August	25	31	31	30	41	894	869	744	715	823
September	34	37	40	35	33	751	923	825	687	730
October	32	31	33	27	34	694	745	842	756	690
November	22	23	32	30	27	735	679	862	684	710
December	14	25	31	18	10	698	713	890	770	608
Total	304	371	353	376	337	8,598	9,016	8,898	8,359	7,970

Source: WSP

The number of drivers involved in alcohol-related fatal collisons dropped from 37.4% during the previous 4-year average to 36.7% in 1991. The percentage of drunk drivers, however, increased from 31.6% during the previous 4-year average to 32.4% in 1991 (Table 2-5). Figure 2-2 shows the long-term trend for both the drinking driver and the DWI driver for the years 1982 to 1991.

Table 2-5: Sobriety of drivers in fatal collisions
Five-year comparison

sobriety of driver	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
Had been drinking - ability impaired	279	324	309	340	296	317	-12.1%
Had been drinking - ability not impaired	30	41	33	45	40	40	-24.5%
Had been drinking - sobriety unknown	7	23	12	15	24	19	-62.2%
Had not been drinking	545	636	657	586	630	627	-13.1%
Not stated	37	45	37	41	46	42	-12.4%
Total drivers drinking	316	388	354	400	360	376	-15.8%
Total drivers - excluding not stated	861	1,024	1,011	986	990	1,003	-14.1%
Total drivers	898	1,069	1,048	1,027	1,036	1,045	-14.1%
Percentage of drivers drinking	36.7%	37.9%	35.0%	40.6%	36.4%	37.4%	-2.0%
Percentage of drivers drunk	32.4%	31.6%	30.6%	34.5%	29.9%	31.6%	2.4%

Source: WSP

Figure 2-2: **Percent of drinking & DWI drivers to total drivers in fatal collisions**
Ten-year comparison

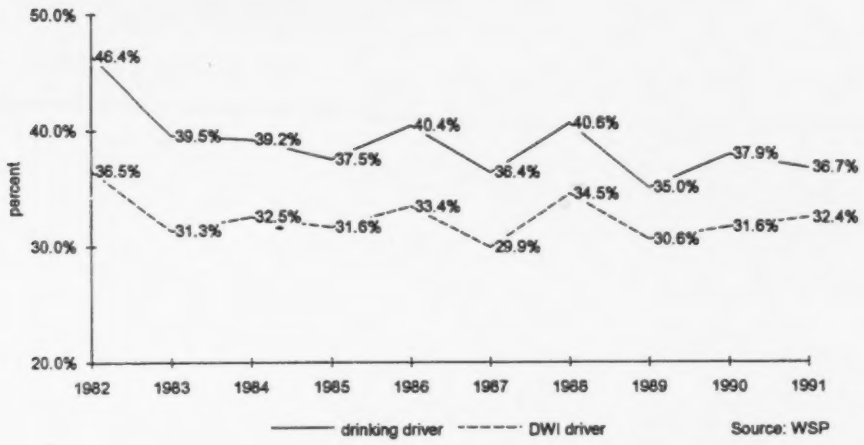


Table 2-6 and 2-7 depict collision statistics for alcohol-related injury collisions and for total investigated alcohol-related collisions. Figure 2-3 compares the percentages of drinking drivers and DWI drivers involved in investigated collisions from 1982 to 1991.

Table 2-6: Sobriety of drivers in injury collisions
Five-year comparison

sobriety of driver	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
Had been drinking - ability impaired	5,429	5,669	5,677	5,306	5,109	5,440	-0.2%
Had been drinking - ability not impaired	1,236	1,547	1,620	1,657	1,718	1,636	-24.4%
Had been drinking - sobriety unknown	1,704	1,868	1,796	2,198	2,268	2,033	-16.2%
Had not been drinking	57,029	60,603	58,541	59,644	54,901	58,422	-2.4%
Not stated	6,653	6,454	5,812	4,992	5,262	5,630	18.2%
Total drivers drinking	8,369	9,084	9,093	9,161	9,095	9,108	-8.1%
Total drivers - excluding not stated	65,399	69,687	67,634	68,805	63,996	67,531	-3.2%
Total drivers	72,051	76,141	73,446	73,797	69,258	73,161	-1.5%
Percentage of drivers drinking	12.8%	13.0%	13.4%	13.3%	14.2%	13.5%	-5.1%
Percentage of drivers drunk	8.3%	8.1%	8.4%	7.7%	8.0%	8.1%	3.0%

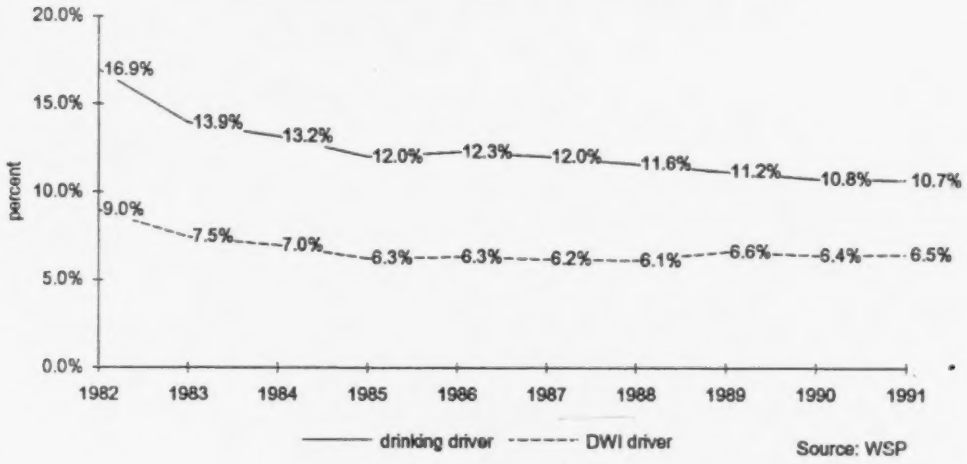
Source: WSP

Table 2-7: Sobriety of drivers in all investigated collisions
Five-year comparison

sobriety of driver	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
Had been drinking - ability impaired	9,331	9,973	9,901	9,532	9,455	9,715	-4.0%
Had been drinking - ability not impaired	2,551	3,118	3,184	3,368	3,548	3,305	-22.8%
Had been drinking - sobriety unknown	3,588	3,669	3,671	5,149	5,289	4,445	-19.3%
Had not been drinking	128,672	138,604	132,731	137,184	133,686	135,551	-5.1%
Not stated	20,590	21,569	19,181	16,082	17,476	18,577	10.8%
Total drivers drinking	15,470	16,760	16,756	18,049	18,292	17,464	-11.4%
Total drivers - excluding not stated	144,142	155,364	149,487	155,233	151,978	153,016	-5.8%
Total drivers	164,732	176,933	168,668	171,315	169,454	171,593	-4.0%
Percentage of drivers drinking	10.7%	10.8%	11.2%	11.6%	12.0%	11.4%	-6.0%
Percentage of drivers drunk	6.5%	6.4%	6.6%	6.1%	6.2%	6.3%	2.0%

Source: WSP

Figure 2-3: **Percentage of drinking and DWI drivers in total collisions**
Ten-year comparison



Source: WSP

Alcohol involvement by age group

When comparing the number of licensed drivers to the number of alcohol-related collisions, drivers under 34 years of age continue to be over-represented and drivers 35 and older are under-represented. The 21-24 year age group has the highest over-representation ratio at 2.33 (Figure 2-4).

Figure 2-4: Percent of all alcohol-related collisions & licensed drivers By age group - 1991

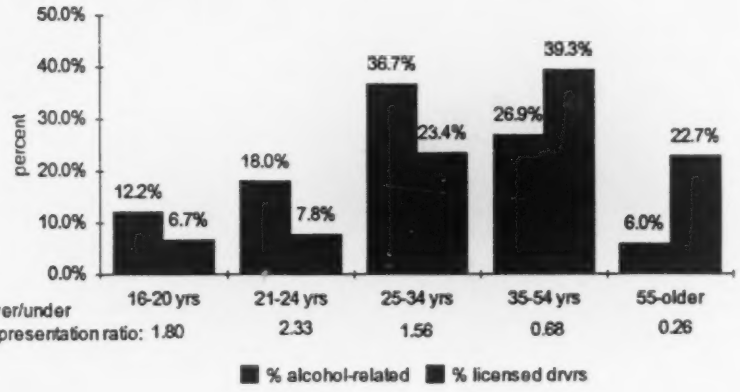
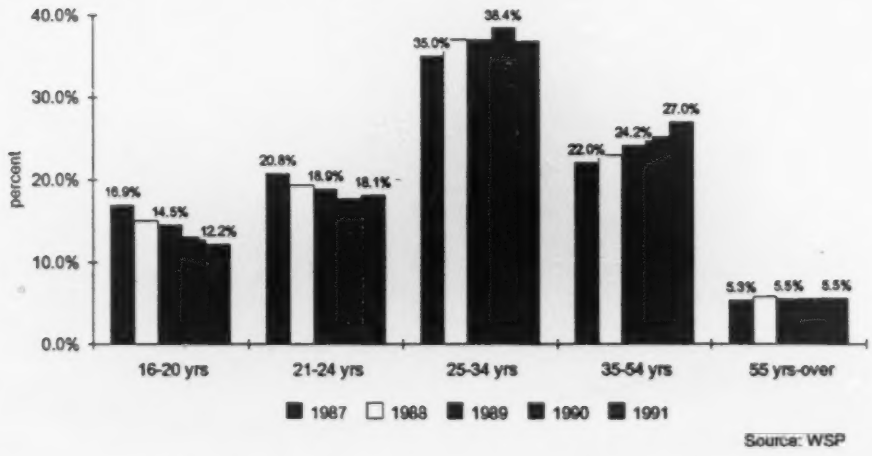


Figure 2-5 shows 5-year trends of drivers by age group involved in alcohol-related collisions. The 35 to 54 year group increased from 22.0% of all drivers involved in 1987 to 27.0% in 1991. In the 16-20 age group, the percent of drivers involved dropped from 16.9% in 1987 to 12.2% in 1991.

Figure 2-5: Percent of total alcohol-related collisions by age group Five-year trend

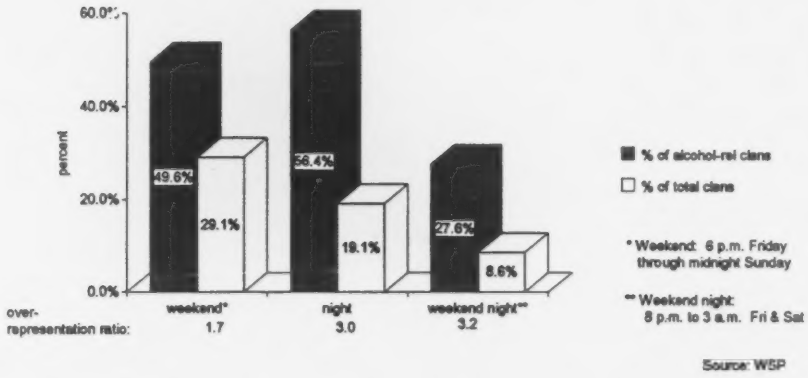


Alcohol involvement during selected time periods

Figure 2-6 shows that 27.6% of alcohol-related collisions but only 8.6% of all collisions occurred during the time period of 8 p.m. to 3 a.m. Fridays and Saturdays. This comparison shows an over-representation ratio of 3.2 for alcohol-related collisions during that period. All nights of the week show an over-representation ratio of 3.0 and weekends (6 p.m. Friday through midnight Sunday) show an over-representation ratio of 1.7.

Figure 2-6:

Percent of alcohol-related collisions & total collisions
By selected time periods - 1991



Source: WSP

Location of single- and multiple-vehicle alcohol-related collisions

Table 2-8 presents statistics on single- and multiple-vehicle collisions in urban and rural areas (2,500 or more population designates urban). Of single-vehicle, fatal collisions, 83.9% occurred in rural areas of the state, while 58.4% of the multiple-vehicle injury collisions occurred in urban areas. Of multiple-vehicle, property-damage-only collisions, 69.5% occurred in urban areas.

Table 2-8: Alcohol-related collisions: urban vs rural
Single- and multiple-vehicle collisions* by severity

	urban		rural		
collisions	number	%	number	%	total
All single	2,304	31.5%	5,013	68.5%	7,317
Fatal	31	16.1%	161	83.9%	192
Injury	1,187	28.0%	3,049	72.0%	4,236
Prop dmg	1,086	37.6%	1,803	62.4%	2,889
All multiple	4,582	63.4%	2,642	36.6%	7,224
Fatal	26	27.4%	69	72.6%	95
Injury	2,095	58.4%	1,493	41.6%	3,588
Prop dmg	2,461	69.5%	1,080	30.5%	3,541
All collisions	6,960	47.3%	7,766	52.7%	14,726
Fatal	63	21.0%	237	79.0%	300
Injury	3,345	42.0%	4,625	58.0%	7,970
Prop dmg	3,552	55.0%	2,904	45.0%	6,456

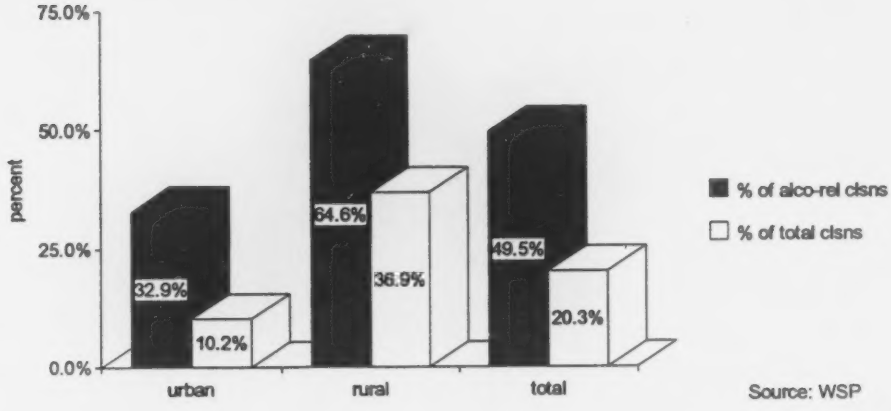
Source: WSP

* Does not include collisions with pedestrians, bicyclists, trains or animals.

Single-vehicle collisions made up 20.3% of all collisions in the state in 1991. Of alcohol-related collisions, single-vehicle collisions made up a much larger percentage, 49.5%. In rural areas, single vehicle-collisions made up 64.6% of all alcohol-related collisions (Figure 2-7).

Figure 2-7:

Single-vehicle collisions in urban & rural areas
Percent of all alcohol-related & total collisions - 1991



Source: WSP

During 1991, 36.8% of drivers in alcohol-related collisions were 25-34 years of age. Drivers in this age group account for about 28% of all vehicle miles traveled, based on a 1990 Nationwide Personal Transportation Study. Youthful drivers 20-24 years of age are involved in 22.2% of the alcohol-related collisions, but travel only 10.9% of the total miles driven. The alcohol-related collision representation ratio of this group is 2.04 and is 1.31 for the 25-34 year age group (Table 2-9).

Table 2-9: Drivers in collisions by age group - 1991
Percent of miles traveled, alcohol-related collisions

driver age	% of miles traveled*	alcohol-related collisions	%	over-under ratio
16-19	3.7%	1,190	8.1%	2.18
20-24	10.9%	3,267	22.2%	2.04
25-34	28.1%	5,411	36.8%	1.31
35-44	24.1%	2,852	19.4%	0.80
45-54	14.6%	1,120	7.6%	0.52
55-64	11.4%	530	3.6%	0.32
65 & over	7.1%	351	2.4%	0.34
Total	99.9%	14,721	100.0%	

Source: WSP, USDOT

* From 1990 Nationwide Personal Transportation Study - USDOT

BAC levels

The frequency of driver blood-alcohol concentration (BAC) levels in fatal and serious injury collisions in 1991 by age group is presented in Table 2-10. The 16-20 age group showed the greatest incidence of involvement at the .10-.14 BAC range. All other groups had the highest frequency of occurrence at the .15-.19 BAC range.

Table 2-10: Driver alcohol levels in fatal & serious injury collisions
By age group - 1991

	BAC level							results	total	test
age	.01-.04	.05-.09	.10-.14	.15-.19	.20-.24	.25-.29	.30-up	n/avail	tested	refused
16-20	24	60	107	80	24	1	5	126	427	39
21-24	16	61	147	170	76	19	2	176	667	93
25-29	16	43	130	167	84	30	7	226	703	180
30-34	17	43	115	140	96	38	11	190	650	165
35-39	8	18	65	89	72	31	9	98	390	113
40-44	7	11	33	59	48	23	9	78	268	89
45-49	5	8	27	46	36	11	9	37	179	43
50-54	6	10	15	28	17	7	2	23	108	22
55-59	0	3	11	21	7	6	4	18	70	15
60-64	2	7	7	23	7	5	1	16	68	7
65-69	3	4	2	10	3	2	0	9	33	4
Over 69	0	1	9	6	2	0	2	7	27	6
Total	104	269	668	839	472	173	61	1,004	3,590	776

Source: WSP

Table 2-11 presents BAC levels of fatally injured drivers as reported by the state toxicologist of drivers killed in fatal crashes during 1987 to 1991. The average BAC level was .17 over the five-year period.

Table 2-11: Toxicologist results of drivers killed in fatal collisions
Five-year comparison - by age

	BAC of .00					BAC of .01 to .09					BAC of .10 and over					avg BAC
age	1991	1990	1989	1988	1987	1991	1990	1989	1988	1987	1991	1990	1989	1988	1987	'87-'91
16	2	5	2	5	5	0	2	0	1	0	1	1	0	1	0	0.06
17	3	6	4	5	8	1	1	1	2	1	0	0	3	1	0	0.06
18	10	8	7	11	8	0	0	2	4	5	5	4	5	2	3	0.13
19	8	8	10	6	6	1	0	2	5	2	4	4	6	3	3	0.13
20	7	10	10	4	5	2	3	3	2	1	6	4	7	7	4	0.15
21	3	3	1	4	2	3	1	0	1	2	8	12	11	7	14	0.18
22	4	10	8	5	3	0	2	3	1	4	7	8	5	12	8	0.15
23	5	3	3	3	5	0	0	1	2	0	10	10	9	7	14	0.20
24	1	4	4	3	1	1	1	1	0	1	2	7	6	4	9	0.17
25	6	5	2	4	6	0	1	0	2	4	7	10	3	15	7	0.17
26	3	5	1	7	5	1	0	1	2	2	6	10	7	4	14	0.17
27	2	3	7	4	1	3	2	1	1	2	4	5	8	5	9	0.16
28	4	7	6	2	4	0	1	4	2	0	5	5	12	7	3	0.17
29	1	5	1	4	6	1	2	1	3	2	4	6	7	6	6	0.17
30	5	3	3	1	3	0	0	0	1	0	4	9	9	7	3	0.20
31	4	3	4	4	3	3	2	0	0	0	13	8	10	5	3	0.19
32	2	1	4	4	3	0	0	1	0	0	4	8	3	12	5	0.20
33	2	0	4	6	2	0	1	1	0	0	1	5	6	3	5	0.16
34	8	2	6	3	2	1	0	0	0	0	5	5	4	5	1	0.21
35	2	6	8	2	4	0	1	0	1	1	2	5	7	6	2	0.20
36	6	4	4	2	4	0	1	2	0	0	5	6	3	9	9	0.18
37	1	3	4	5	2	0	0	0	0	1	5	4	2	6	1	0.16
38	2	3	2	1	1	0	1	0	2	0	3	5	0	5	3	0.17
39	1	2	2	2	1	0	1	0	0	0	0	3	2	3	4	0.15
40	3	3	2	2	2	0	1	0	0	0	3	5	4	3	2	0.19
41-45	13	15	15	11	14	0	1	1	4	2	14	14	10	13	10	0.18
46-50	7	13	10	4	6	0	1	3	1	0	11	7	6	7	10	0.19
51-55	5	13	5	4	8	1	0	0	1	0	4	6	5	5	6	0.19
56-60	8	6	12	7	7	0	0	0	0	0	5	4	1	3	2	0.22
61-65	8	5	6	4	9	0	1	0	0	0	4	1	3	4	6	0.18
66 & over	32	23	39	27	18	2	3	1	1	2	2	2	1	3	2	0.14
Total	168	188	197	156	154	20	30	29	39	32	154	185	165	180	168	0.17

Source: State Toxicologist

Alcohol-related collisions by day of week/roadway type

An analysis of roadway type by day of occurrence for fatal and injury collisions involving alcohol indicates that Saturdays recorded the highest incidence on all types of roadways, registering 2,027 collisions. These collisions occurred predominately on county roads and city streets on weekends (Table 2-12).

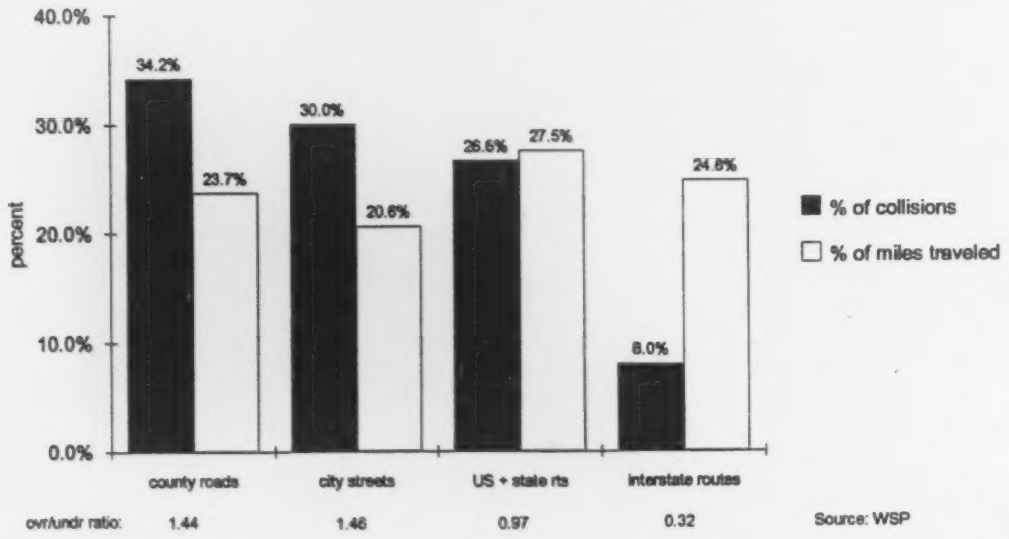
Table 2-12: Fatal and injury collisions involving alcohol
By roadway type and day of week - 1991

roadway type	Mon	Tue	Wed	Thu	Fri	Sat	Sun	total	percent
County roads	254	280	292	335	433	724	531	2,849	34.2%
City streets	277	248	281	290	426	560	415	2,497	30.0%
U.S. & state routes	196	238	196	235	385	546	414	2,210	26.6%
Interst & full control	60	70	49	80	117	160	127	663	8.0%
Other routes	5	9	5	8	6	37	31	101	1.2%
Total	792	845	823	948	1,367	2,027	1,518	8,320	100.0%
% of total	9.5%	10.2%	9.9%	11.4%	16.4%	24.4%	18.2%		

Source: WSP

City streets accounted for 30.0% of fatal and injury alcohol-related collisions, but only 20.6% of all miles traveled, yielding an over-represention ratio of 1.46 in alcohol-related collisions. County roads were similarly over-represented at 1.44. Interstate routes were under-represented with 0.32 (Figure 2-8).

Figure 2-8: Fatal and injury collisions involving alcohol
By roadway type - 1991



Alcohol-related collisions by county and roadway type

Table 2-13 shows alcohol-related collisions, percentage of registered vehicles, and over-under ratios by county. Of counties with over 100 alcohol-related collisions, Kittitas and Mason Counties had the highest over-representation ratios with 1.56 and 1.46 respectively. Clallam, with 0.66, was the most under-represented of all counties with more than 100 alcohol-related collisions.

Table 2-13: Alcohol-related collisions
By county and type of roadway - 1991

	collisions				by type of roadway			
county	alco-rel collisions	%	% reg. vehicles	ovr/undr ratio	city streets	state routes*	county roads	other roads
Adams	44	0.3%	0.37%	0.80	5	21	18	0
Asotin	36	0.2%	0.34%	0.72	10	7	19	0
Benton	230	1.6%	2.21%	0.70	119	64	46	1
Chelan	170	1.2%	1.26%	0.91	60	45	62	3
Clallam	125	0.8%	1.28%	0.66	29	52	39	5
Clark	622	4.2%	4.93%	0.85	123	168	331	0
Columbia	22	0.1%	0.10%	1.49	3	5	12	2
Cowlitz	244	1.7%	1.80%	0.92	97	78	69	0
Douglas	67	0.5%	0.49%	0.93	8	37	22	0
Ferry	34	0.2%	0.10%	2.30	2	13	17	2
Franklin	144	1.0%	0.97%	1.00	93	26	25	0
Garfield	5	0.0%	0.07%	0.48	1	4	0	0
Grant	183	1.2%	1.21%	1.02	46	65	67	5
Grays Harbor	276	1.9%	1.33%	1.40	83	129	53	11
Island	124	0.8%	1.06%	0.79	15	38	70	1
Jefferson	80	0.5%	0.43%	1.26	11	28	38	3
King	4,044	27.4%	30.99%	0.88	1,968	1,401	660	15
Kitsap	705	4.8%	3.67%	1.30	161	191	347	6
Kittitas	134	0.9%	0.58%	1.56	21	73	32	8
Klickitat	64	0.4%	0.37%	1.17	8	29	27	0
Lewis	226	1.5%	1.41%	1.08	55	85	82	4
Lincoln	35	0.2%	0.26%	0.91	2	22	11	0
Mason	179	1.2%	0.83%	1.46	23	65	86	5
Okanogan	123	0.8%	0.70%	1.19	11	45	59	8
Pacific	88	0.6%	0.38%	1.57	10	52	25	1
Pend Oreille	39	0.3%	0.19%	1.39	2	17	18	2
Pierce	1,977	13.4%	10.74%	1.25	763	554	642	18
San Juan	37	0.3%	0.26%	0.96	7	0	30	0
Skagit	312	2.1%	1.97%	1.07	78	143	91	0
Skamania	41	0.3%	0.13%	2.13	6	15	10	10
Snohomish	1,551	10.5%	9.88%	1.06	418	537	586	10
Spokane	931	6.3%	7.06%	0.89	451	207	269	4
Stevens	93	0.6%	0.58%	1.09	4	34	52	3
Thurston	482	3.3%	4.05%	0.81	139	124	215	4
Wahkiakum	10	0.1%	0.06%	1.13	0	9	1	0
Walla Walla	114	0.8%	0.81%	0.95	53	34	27	0
Whatcom	423	2.9%	2.66%	1.08	132	112	172	7
Whitman	77	0.5%	0.63%	0.83	23	31	23	0
Yakima	685	4.6%	3.75%	1.24	245	144	279	17

* Includes interstate and U.S. routes

Source: WSP

A five-year comparison of collisions by county where drivers "had been drinking" (including DWI) reveals that the counties of Lincoln, Grant, Klickitat, Columbia and Douglas all experienced increases in alcohol-related collisions during 1991 over the previous 4-year average. One county, Skamania, experienced no change, and all other counties recorded reductions in 1991 compared to the previous 4-year average (Table 2-14).

Table 2-14: Collisions where driver "had been drinking"
Five-year comparison by county

county	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
Adams	44	41	55	43	44	46	-3.8%
Asotin	36	38	35	45	43	40	-10.6%
Benton	230	249	268	290	277	271	-15.1%
Chelan	170	180	230	216	214	210	-19.0%
Clallam	125	157	192	203	187	185	-32.3%
Clark	622	725	680	675	668	687	-9.5%
Columbia	22	20	30	16	19	21	3.5%
Cowlitz	244	290	296	292	291	292	-16.5%
Douglas	67	63	58	75	70	67	0.8%
Ferry	34	51	43	43	40	44	-23.2%
Franklin	144	138	131	184	172	156	-7.8%
Garfield	5	5	5	5	10	6	-20.0%
Grant	183	174	170	151	168	166	10.4%
Grays Harbor	276	300	267	349	345	315	-12.5%
Island	124	138	122	131	151	136	-8.5%
Jefferson	80	96	85	92	91	91	-12.1%
King	4,044	4,530	4,663	5,174	5,272	4,910	-17.6%
Kitsap	705	721	699	680	730	708	-0.4%
Kittitas	134	133	142	137	129	135	-0.9%
Klickatat	64	63	54	48	81	62	4.1%
Lewis	226	230	234	261	244	242	-6.7%
Lincoln	35	25	23	39	31	30	18.6%
Mason	179	197	214	219	190	205	-12.7%
Okanogan	123	138	125	157	170	148	-16.6%
Pacific	88	92	89	82	93	89	-1.1%
Pend Oreille	39	42	42	43	35	41	-3.7%
Pierce	1,977	2,122	1,992	2,288	2,391	2,198	-10.1%
San Juan	37	44	42	50	35	43	-13.5%
Skagit	312	323	343	329	307	326	-4.1%
Skamania	41	48	41	40	35	41	0.0%
Snohomish	1,551	1,729	1,672	1,741	1,783	1,731	-10.4%
Spokane	931	934	987	1,076	1,123	1,030	-9.6%
Stevens	93	94	104	105	118	105	-11.6%
Thurston	482	503	518	488	541	513	-6.0%
Wahkiakum	10	13	12	20	19	16	-37.5%
Walla Walla	114	130	144	124	111	127	-10.4%
Whatcom	423	447	447	487	476	464	-8.9%
Whitman	77	63	102	99	105	92	-16.5%
Yakima	685	712	705	802	781	750	-8.7%
Total	14,776	15,998	16,061	17,299	17,590	16,737	-11.7%

Source: WSP

A comparison of collisions that involved a DWI driver by county reveals that Douglas county experienced the largest increase (47.7%) in collisions of this type during 1991 compared to the previous 4-year average. Overall, there were 4.2% fewer DWI collisions in 1991 verses the previous 4-year average.

Table 2-15: Collisions where driver was "intoxicated"
Five-year comparison by county

county	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
Adams	38	28	45	23	31	32	19.7%
Asotin	19	23	16	24	17	20	-5.0%
Benton	155	171	184	189	172	179	-13.4%
Chelan	111	108	153	120	136	129	-14.1%
Clallam	74	96	126	119	107	112	-33.9%
Clark	381	406	394	334	366	375	1.6%
Columbia	13	10	19	6	13	12	8.3%
Cowlitz	154	173	185	165	168	173	-10.9%
Douglas	55	41	35	34	39	37	47.7%
Ferry	22	25	18	26	20	22	-1.1%
Franklin	97	96	79	99	94	92	5.4%
Garfield	2	3	3	2	7	4	-46.7%
Grant	119	114	116	94	98	106	12.8%
Grays Harbor	187	188	149	195	185	179	4.3%
Island	82	79	71	55	85	73	13.1%
Jefferson	48	61	53	57	52	56	-13.9%
King	2,240	2,554	2,621	2,561	2,500	2,559	-12.5%
Kitsap	463	467	441	413	428	437	5.9%
Kittitas	75	83	86	73	56	75	0.7%
Klickatat	45	38	27	27	52	36	25.0%
Lewis	150	144	144	137	126	138	8.9%
Lincoln	15	17	16	13	16	16	-3.2%
Mason	107	140	132	111	101	121	-11.6%
Okanogan	79	91	81	97	102	93	-14.8%
Pacific	49	58	56	45	52	53	-7.1%
Pend Oreille	23	26	29	18	13	22	7.0%
Pierce	1,261	1,325	1,282	1,294	1,303	1,301	-3.1%
San Juan	19	25	18	27	9	20	-3.8%
Skagit	225	225	227	202	185	210	7.3%
Skamania	20	37	23	26	19	26	-23.8%
Snohomish	1,041	1,112	1,104	1,051	1,048	1,079	-3.5%
Spokane	580	621	582	561	565	582	-0.4%
Stevens	57	58	66	54	60	60	-4.2%
Thurston	338	306	343	283	322	314	7.8%
Wahkiakum	6	7	3	12	16	10	-36.8%
Walla Walla	77	90	103	75	55	81	-4.6%
Whatcom	288	307	281	294	255	284	1.3%
Whitman	44	32	55	58	55	50	-12.0%
Yakima	478	502	450	489	470	478	0.1%
TOTAL	9,237	9,887	9,816	9,463	9,398	9,641	-4.2%

Source: WS

III. Safety Restraint Use

Most restraint usage rates in this summary are based upon data collected by law enforcement officers during collision investigations. When direct observation is impossible, the officer's only alternative is to question those involved as to their seat belt use. Since Washington has a mandatory seat belt use law, the human tendency is to report compliance, when in fact no belt was worn, artificially inflating the usage rate. These rates are most useful for comparison purposes. Observational studies are more accurate, but they are limited to shoulder-belt use by drivers and front-window-seat passengers.

Observed belt use

A steady increase in restraint usage over the last few years has been accompanied by a reduction of 14.1% for 1991 in fatalities and 15.9% in disabling injuries from the previous 4-year average (Table 3-1).

Table 3-1: Observed seatbelt use, deaths and injuries
Five-year comparison

	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
Observed SB use rate+	69%	**	55%	53%	52%	53%	29.4%
Fatal rate*	1.50	1.87	1.83	1.88	2.05	1.91	-21.6%
Disabling injury rate*	14.98	17.33	18.84	19.95	22.08	19.55	-23.4%
Deaths	683	825	781	785	790	795	-14.1%
Disabling injuries	6,839	7,653	8,044	8,318	8,506	8,130	-15.9%
Motor vehicle travel	45,663	44,157	42,696	41,698	38,520	41,768	9.3%

Source: WSP, WSDOT, WTSC

*Fatalities/disabling injuries per 100 million miles of travel
+Surveys performed October 1987, April 1988, May 1989, Sept 1991.
**1990 observational survey not performed.

Western Washington occupants were observed wearing their seat restraints 70.3% of the time while Eastern Washington occupants were observed wearing theirs 64.3%. Interstate highway travel had the highest usage rate at 71.9% while city streets was lowest at 62.5% (Table 3-2).

Table 3-2: Observed belt use - September 1991
By roadway characteristics

characteristic	percent	characteristic	percent
Western Washington	70.3%	Commuter rush hours	70.5%
Eastern Washington	64.3%	Non-rush hours	67.8%
Three or more lanes*	72.9%	Average speed 60 mph	72.3%
Two lanes*	68.3%	Average speed 40 mph	64.0%
One lane*	60.9%	Average speed 20 mph	62.1%
Interstate highways	71.9%		
County roads	71.8%		
US routes	67.2%		
State routes	66.1%		
City streets	62.5%		

* For one direction of travel

Source: WTSC

Restraint use and injuries sustained

During 1991, a reported 168,527 occupant were wearing restraints when involved in collisions. Last year, 330 occupants who were not using any type of restraint died and 2,131 were seriously injured (Table 3-3). Based on 1991 investigated collision data, it is estimated that an occupant who does not "buckle up" is 14 times as likely to be killed and 5.6 times as likely to be seriously injured than one who does.

Table 3-3: Restraint use and injuries sustained* - 1991

	total occupants+		restraints used		restraints not used		child restraints**	
type	number	%	number	%	number	%	number	%
Deaths	504	0.3%	174	0.1%	330	1.4%	4	0.1%
Disabling injuries	4,831	2.5%	2,700	1.6%	2,131	9.0%	19	0.7%
Evident injuries	17,751	9.2%	12,240	7.3%	5,511	23.3%	135	4.6%
Possible injuries	28,038	14.6%	24,041	14.3%	3,997	16.9%	222	7.6%
No injuries	141,035	73.4%	129,372	76.8%	11,663	49.4%	2,538	87.0%
Total	192,159	100.0%	168,527	100.0%	23,632	100.0%	2,918	100.0%

Source: WSP

*Excludes cases where injury severity was not stated or where restraint use was unknown.
+Does not include 35 occupants where the injury data was unknown.
**Included with restraints used category.

Table 3-4: Types of restraints used in collisions
By severity of injury - 1991

type	deaths		disabling injury		evident injury		possible injury		no injury	
	#	%	#	%	#	%	#	%	#	%
Lap belt	22	4.4%	405	8.4%	2,036	11.5%	2,851	10.2%	18,532	13.2%
Shoulder belt	4	0.8%	74	1.5%	292	1.6%	543	1.9%	3,144	2.2%
Lap & shoulder	140	27.8%	2,188	45.3%	9,710	54.7%	20,374	72.7%	104,906	74.5%
Child restraint	4	0.8%	19	0.4%	135	0.8%	222	0.8%	2,538	1.8%
Air bag*/belted	2	0.4%	10	0.2%	58	0.3%	42	0.1%	69	**
Air bag*/no blt	2	0.4%	4	0.1%	9	0.1%	9	**	27	**
No restraints	330	65.5%	2,131	44.1%	5,511	31.0%	3,997	14.3%	11,663	8.3%
Total occupants	504	100.0%	4,831	100.0%	17,751	100.0%	28,038	100.0%	140,879	100.0%

* Activated

**Less than 1/10 of 1 percent

Source: WSP

Table 3-5: Restraint use in collisions
By occupant age - 1991

age	lap belt	shoulder belt	lap & shldr belt	child restraint	total rstrnt used	total not used	% restraint used	air bag activd + rstrnt	air bag activd - rstrnt
Under 1	39	9	98	695	841	61	93.2%	--	--
1	91	7	146	967	1,211	79	93.9%	--	--
2	273	12	302	674	1,261	128	90.8%	1	0
3	410	14	417	358	1,200	146	89.0%	1	0
4	481	23	491	142	1,138	154	88.1%	1	0
5	475	17	542	48	1,082	134	89.0%	0	0
6	450	10	477	34	971	117	89.2%	0	0
7	377	19	429	--	825	139	85.6%	0	0
8	365	17	484	--	866	139	86.2%	0	1
9	325	9	488	--	822	119	87.4%	0	2
10	331	13	445	--	789	144	84.6%	0	0
11	296	17	475	--	788	148	84.2%	0	0
12	297	23	499	--	819	143	85.1%	0	0
13	304	17	502	--	823	179	82.1%	0	0
14	390	26	715	--	1,131	302	78.9%	1	0
15	546	48	1,265	--	1,859	563	76.8%	1	0
16	850	121	3,847	--	4,818	992	82.9%	3	0
17	908	158	4,690	--	5,756	1,036	84.7%	4	2
18	809	159	4,765	--	5,733	1,216	82.5%	4	3
19	763	151	4,577	--	5,491	1,091	83.4%	2	1
20	696	147	4,572	--	5,415	1,161	82.3%	2	2
21 - 24	2,182	422	15,853	--	18,457	3,322	84.7%	13	6
25 - 29	2,269	455	16,777	--	19,501	3,060	86.4%	18	7
30 - 64	8,124	1,712	61,671	--	71,567	7,515	90.5%	104	21
65 & over	1,318	354	10,571	--	12,243	941	92.9%	23	6
Unknown	521	98	2,378		2,997	620	82.9%	3	0
Total	23,890	4,058	137,476	2,918	168,404	23,651	87.7%	181	51

Source: WSP, WSDOT

Male-female safety restraint usage in collisions

Female motor-vehicle occupants in collisions are reported to use their restraints more often than male occupants. Percentages for all groups has increased steadily over the past 5 years (Table 3-6)

Table 3-6: Percent of safety restraint usage rates in collisions*
Five-year comparison by sex

occupant	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
Male driver	88.3%	85.5%	81.4%	80.3%	77.8%	81.3%	8.7%
Female driver	92.2%	89.4%	86.0%	85.5%	83.3%	86.1%	7.1%
Male passenger	79.9%	76.4%	71.9%	70.9%	69.0%	72.1%	10.9%
Female passenger	85.9%	83.4%	79.0%	78.5%	75.9%	79.2%	8.5%

*Excludes occupants where restraint use was unknown Source: WSP

Restraint use by seat position

Drivers continue to be the most frequent users of safety restraints, followed by occupants riding in the right front seat, then occupants in the right back seat. Mid-front and mid-back occupants continue to have the lowest rates, except for the "other" position, which includes positions in non-designated areas such as the back of station wagons and truck beds (Table 3-7). Children aged 0-4 sitting in the left-back, right-back and middle-back recorded the highest usage rates (Table 3-8).

Table 3-7: Percentage of restraint use by occupant position
Five-year comparison

occupants	1991	1990	1989	1988	1987
Driver	89.6%	86.8%	82.9%	82.1%	79.7%
Mid-front	67.4%	62.1%	57.0%	54.8%	51.8%
Right-front	85.7%	82.5%	78.3%	78.0%	74.9%
Left-back	84.6%	81.3%	78.4%	77.7%	74.9%
Mid-back	75.1%	73.0%	68.9%	66.7%	62.4%
Right-back	85.0%	82.8%	78.4%	77.8%	74.1%
Other	40.9%	39.2%	31.6%	29.0%	28.8%
Average	75.5%	72.5%	67.9%	66.6%	63.8%

Source: WSP, WSDOT

Table 3-8: Percent of reported restraint useage in collisions
By occupant age & seat position - 1991

seat position	0-4	5-9	10-14	15-20	21-24	25-29	30-64	65/over
Driver	-	-	-	86.5%	87.3%	88.1%	91.3%	92.9%
Mid-front	81.9%	76.1%	67.4%	53.0%	41.5%	56.4%	70.3%	78.6%
Right-front	89.8%	91.0%	87.3%	81.3%	80.8%	83.1%	88.5%	93.3%
Left-back	95.5%	91.2%	86.2%	74.7%	72.2%	75.9%	79.4%	90.7%
Mid-back	92.0%	84.9%	74.6%	52.8%	57.7%	48.0%	51.4%	94.1%
Right-back	95.0%	91.2%	84.3%	77.4%	72.1%	74.5%	82.0%	93.2%
Other	57.8%	52.9%	46.6%	21.6%	23.0%	25.5%	34.1%	50.0%
Unknown	73.6%	74.8%	53.6%	58.6%	46.9%	47.7%	64.9%	86.7%

Source: WSP, WSDOT

Restraint use in collisions by road type

Of the occupants that were involved in investigated collisions occurring on Interstate highways, 92.2% indicated that they were wearing restraints. County road travelers had the lowest reported usage rate at 82.3% (Table 3-9).

Table 3-9: Restraint use in collisions by roadway type
Five-year comparison

functional class	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
Interstate	92.2%	90.4%	87.0%	86.5%	84.6%	87.1%	5.8%
Other state routes	88.6%	85.0%	81.5%	79.8%	82.0%	82.1%	8.0%
County roads	82.3%	79.9%	75.9%	75.0%	72.5%	75.8%	8.5%
City streets	88.9%	85.8%	81.5%	80.7%	77.9%	81.5%	9.1%
All others	70.8%	68.2%	60.9%	64.0%	63.6%	64.2%	10.3%

Source: WSP, WSDOT

Restraint use by occupants in investigated collisions

Occupants of passenger cars had the highest reported usage rate of 88.7% for vehicles involved in investigated collisions, followed by heavy trucks at 86.3% and light trucks at 85.6% (Table 3-10).

Table 3-10: Reported restraint use by occupants in investigated collisions
Five-year comparison by type of vehicle

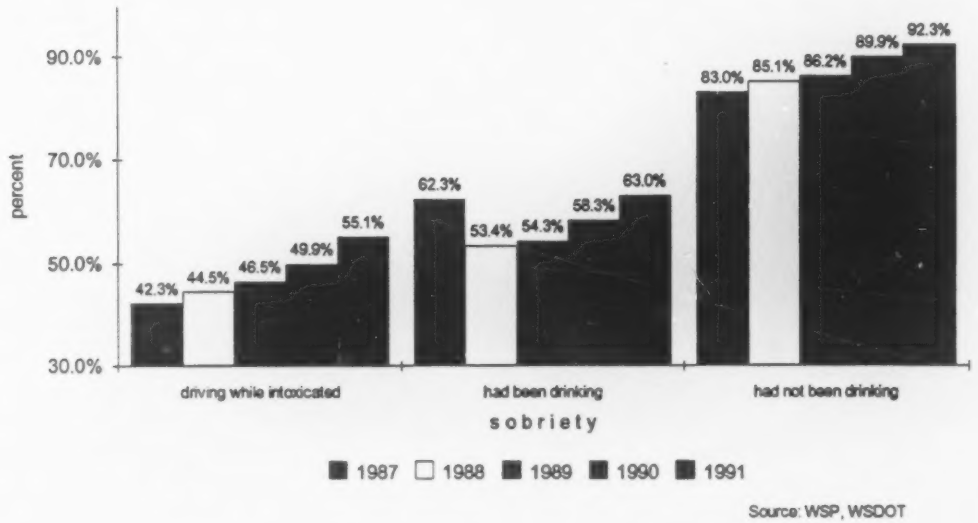
type of vehicle	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
Passenger car	88.7%	86.0%	82.1%	81.6%	78.9%	82.2%	8.0%
Light trucks	85.6%	82.5%	78.0%	76.2%	73.1%	77.5%	10.5%
Heavy trucks	86.3%	82.2%	75.8%	71.7%	67.7%	74.4%	16.1%
All others	74.7%	74.6%	73.2%	68.3%	69.5%	71.4%	4.6%

Source: WSP, WSDOT

Restraint use by sobriety

Of all drivers involved in 1991 collisions, those who had been drinking were less likely to be wearing restraints than those who had not been drinking. The restraint usage rate for the non-drinking category was reported at 92.3%. Those drinking had a much lower usage rate, with 55.1% for drivers under the influence of intoxicants and 63.0% for drivers who had been drinking (Figure 3-1).

Figure 3-1: **Restraint use by drivers in collisions**
Five-year comparison by sobriety

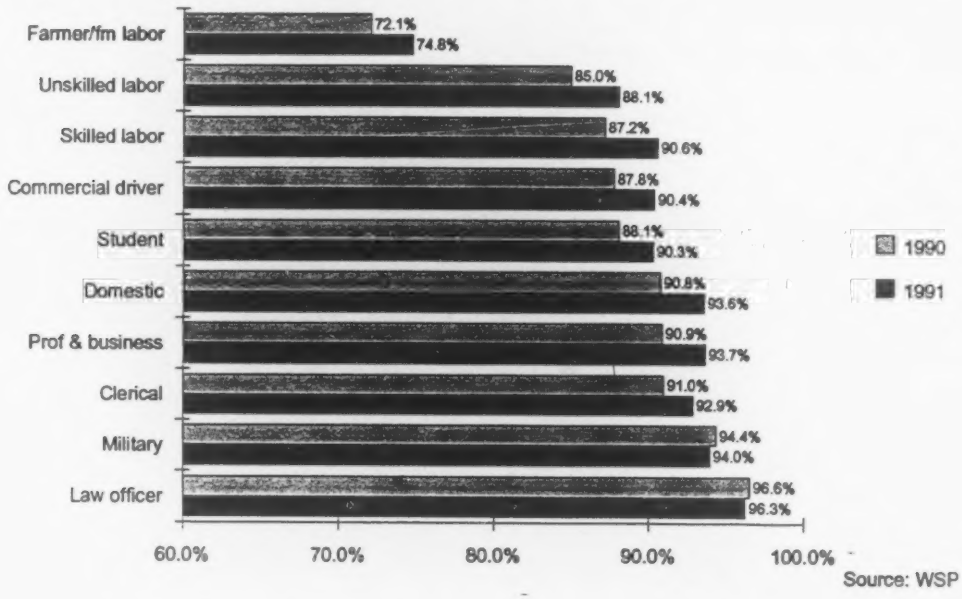


Source: WSP, WSDOT

Restraint use by driver occupation

Law enforcement officers and military personnel reported the highest restraint usage rates for 1991 with 96.3% and 94.0% respectively. Farmers and farm laborers reported the lowest rate with 74.8% (Figure 3-2).

Figure 3-2: Safety restraint use by driver occupation



Restraint use by county

King County reported the highest usage rate with 92.9% up 8.1% from the previous 4-year average. San Juan County had the lowest usage rate for 1991 at 54.2%. Ferry and Lincoln Counties each had reductions in their usage rates from 1990, but still improved over their previous 4-year averages (Table 3-11).

Table 3-11: Seat belt use in investigated collisions
Five-year comparison - by county

county	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
Adams	83.0	75.6	71.4	74.4	71.6	73.3	13.3%
Asotin	67.0	54.9	57.8	54.2	57.2	56.0	19.6%
Benton	89.0	82.2	75.0	75.3	71.9	76.1	17.0%
Chelan	91.2	83.7	81.3	79.9	77.7	76.3	19.5%
Clallam	88.1	82.1	76.8	75.6	70.7	74.1	18.9%
Clark	87.8	80.4	75.0	72.8	68.1	63.9	37.4%
Columbia	79.7	67.9	67.7	74.0	46.0	71.0	12.3%
Cowlitz	82.9	76.2	72.9	68.3	66.6	77.7	6.8%
Douglas	87.0	79.4	77.7	77.8	75.7	65.1	33.7%
Ferry	71.4	73.4	63.2	53.9	57.9	62.1	15.0%
Franklin	78.5	70.6	68.5	65.1	56.1	65.1	20.6%
Garfield	87.1	57.6	65.7	59.7	62.3	61.3	42.0%
Grant	81.1	75.4	69.3	73.8	70.8	72.3	12.1%
Grays Harbor	79.9	74.3	67.5	64.0	63.2	67.3	18.8%
Island	90.8	89.2	85.4	85.1	81.6	85.3	6.4%
Jefferson	82.7	79.3	75.4	75.3	73.0	75.8	9.2%
King	92.9	89.1	86.0	85.0	83.7	86.0	8.1%
Kitsap	89.7	84.2	81.2	78.9	86.6	82.7	8.4%
Kittitas	89.1	81.4	78.2	79.4	72.5	77.9	14.4%
Klickitat	84.0	72.5	72.7	68.0	62.0	68.8	22.1%
Lewis	87.9	81.6	77.1	72.6	69.8	75.3	16.8%
Lincoln	77.9	80.7	73.9	71.0	72.1	74.4	4.7%
Mason	84.1	76.7	70.0	68.9	65.6	70.3	19.6%
Okanogan	74.0	67.6	62.0	53.9	54.0	59.4	24.6%
Pacific	84.4	75.0	71.9	78.4	65.4	72.7	16.1%
Pend Oreille	71.2	67.6	58.8	65.6	57.3	62.3	14.2%
Pierce	89.4	85.2	80.0	82.3	79.2	81.7	9.5%
San Juan	54.2	52.7	56.8	54.1	47.3	52.7	2.8%
Skagit	85.2	81.9	77.6	72.8	75.3	76.9	10.8%
Skamania	85.4	70.9	70.7	55.5	62.3	64.9	31.7%
Snohomish	89.3	85.1	80.2	79.2	77.1	80.4	11.1%
Spokane	90.0	84.8	82.4	80.7	78.2	81.5	10.4%
Stevens	78.4	67.0	57.5	70.8	57.5	63.2	24.1%
Thurston	89.8	85.1	82.6	81.6	76.2	81.4	10.4%
Wahkiakum	87.5	82.9	81.8	71.2	71.1	76.8	14.0%
Walla Walla	82.4	76.6	72.0	71.5	68.6	72.2	14.2%
Whatcom	90.8	86.7	81.6	79.4	75.3	80.8	12.4%
Whitman	84.9	81.7	79.4	77.8	76.6	78.9	7.6%
Yakima	82.8	76.0	68.7	66.8	64.8	69.1	19.9%

Source: WSP

Seat belt use in fatal accidents

In 1991 34.8% of fatal victims were wearing restraints. This figure is up from 27.0% for 1990 and for the previous 4-year average. The highest percentage was in Kittitas County where 92.3% of the victims were wearing restraints (Table 3-12).

Table 3-12: Seatbelt use in fatal collisions
Five-year comparison

county	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
Adams	11.1%	0.0%	9.1%	14.3%	0.0%	7.4%	50.0%
Asotin	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Benton	36.4%	11.1%	20.0%	33.3%	33.3%	21.1%	72.7%
Chelan	33.3%	33.3%	20.0%	20.0%	47.1%	34.1%	-2.4%
Clallam	50.0%	57.1%	26.7%	0.0%	33.3%	32.0%	56.3%
Clark	48.1%	26.7%	15.4%	47.1%	29.4%	27.8%	73.3%
Columbia	0.0%	33.3%	0.0%	0.0%	33.3%	22.2%	**
Cowlitz	50.0%	53.3%	36.4%	16.7%	13.3%	30.2%	65.6%
Douglas	33.3%	0.0%	0.0%	0.0%	0.0%	0.0%	**
Ferry	33.3%	0.0%	0.0%	16.7%	33.3%	9.5%	250.0%
Franklin	33.3%	27.3%	30.0%	12.5%	11.1%	21.1%	58.3%
Garfield	0.0%	0.0%	0.0%	100.0%	75.0%	80.0%	-100.0%
Grant	50.0%	17.4%	26.3%	40.0%	30.0%	26.9%	86.1%
Grays Harbor	18.8%	33.3%	42.9%	0.0%	23.5%	20.8%	-10.0%
Island	66.7%	42.9%	50.0%	33.3%	33.3%	39.1%	70.4%
Jefferson	40.0%	66.7%	42.9%	50.0%	37.5%	44.8%	-10.8%
King	41.1%	32.7%	32.5%	32.0%	25.6%	30.9%	33.0%
Kitsap	40.9%	11.1%	35.7%	26.7%	16.7%	24.0%	70.5%
Kittitas	92.3%	25.8%	28.6%	33.3%	25.0%	27.6%	234.6%
Klickitat	33.3%	23.1%	100.0%	37.5%	14.3%	27.6%	20.8%
Lewis	12.5%	28.6%	11.1%	21.4%	21.4%	20.9%	-40.2%
Lincoln	42.9%	0.0%	33.3%	66.7%	0.0%	33.3%	28.6%
Mason	33.3%	42.9%	0.0%	15.4%	36.4%	20.9%	59.3%
Okanogan	28.6%	9.1%	0.0%	0.0%	5.9%	3.8%	657.1%
Pacific	75.0%	0.0%	20.0%	0.0%	0.0%	8.3%	800.0%
Pend Oreille	0.0%	33.3%	33.3%	60.0%	0.0%	33.3%	-100.0%
Pierce	27.0%	27.6%	25.5%	33.3%	19.1%	26.7%	1.2%
San Juan	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Skagit	54.5%	33.3%	35.7%	14.3%	38.5%	28.8%	89.5%
Skamania	0.0%	0.0%	60.0%	33.3%	0.0%	40.0%	-100.0%
Snohomish	29.6%	30.9%	27.1%	31.9%	35.6%	31.3%	-5.3%
Spokane	40.0%	24.2%	24.2%	41.2%	44.4%	33.8%	18.3%
Stevens	22.2%	25.0%	16.7%	0.0%	14.3%	16.1%	37.8%
Thurston	14.3%	18.8%	35.7%	31.6%	10.0%	25.4%	-43.8%
Wahkiakum	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Walla Walla	30.8%	60.0%	66.7%	80.0%	42.9%	64.3%	-52.1%
Whatcom	25.0%	11.1%	26.7%	21.4%	25.0%	20.6%	21.2%
Whitman	40.0%	16.7%	40.0%	83.3%	0.0%	35.7%	12.0%
Yakima	21.2%	17.9%	11.1%	15.8%	25.7%	17.5%	21.1%
Total	34.8%	27.0%	25.8%	28.9%	26.3%	27.0%	28.9%

** Increase from zero.

Source: WSP

IV. Youth Involvement

The number of youthful drivers (24 years of age and younger) involved in traffic collisions has decreased for the fifth consecutive year. During 1991, 55,559 youthful drivers were involved in 48,564 traffic collisions. Fatal, injury, and total collisions involving youth declined 17.5%, 5.6% and 7.9% respectively from the previous 4-year average. The total collision rate (youthful drivers involved per 1,000 licensed drivers) decreased 12.6% (Table 4-1).

Table 4-1: Youthful drivers (24 & younger) in collisions
Five-year comparison

collisions & rates	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
Total collisions	48,564	50,906	51,507	53,375	55,078	52,717	-7.9%
Fatal collisions	221	261	249	271	290	268	-17.5%
Injury collisions	20,922	21,798	22,127	22,607	22,118	22,163	-5.6%
Persons killed	255	301	287	314	330	308	-17.2%
Persons injured	32,546	34,225	34,449	35,100	33,727	34,375	-5.3%
Youthful licensed drivers	518,047	481,691	496,433	497,527	490,144	491,449	5.4%
Youthful drivers involved	55,559	58,026	58,689	61,408	63,531	60,414	-8.0%
Fatal collision rate*	0.43	0.54	0.50	0.54	0.59	0.54	-21.7%
Total collision rate*	93.74	105.68	103.75	107.28	112.37	107.27	-12.6%

* Fatal collisions/total collisions per 1,000 youthful licensed drivers

Source: WSP, DOL

Collision involvement by driver age

The youthful age groups 16-20 and 21-24 years both recorded decreases during the past several years, while the older groups recorded increases (Figure 4-1). The 16-20 year-old group was involved in 15.4% of all collisions and made up 6.7 % of the state's licensed drivers, creating an over-representation ratio of 2.28 (Figure 4-2).

Figure 4-1: Percent of all collisions by driver age groups
Five-year trends

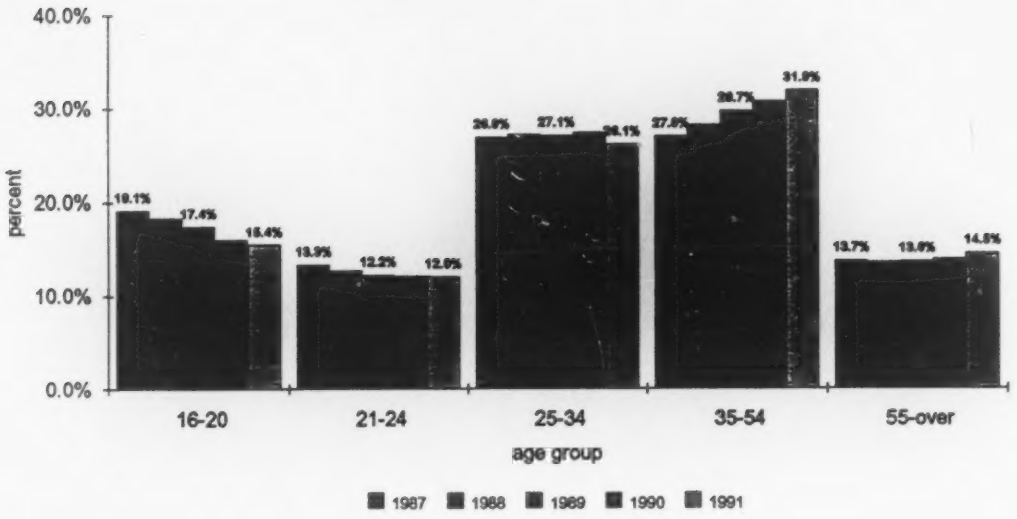
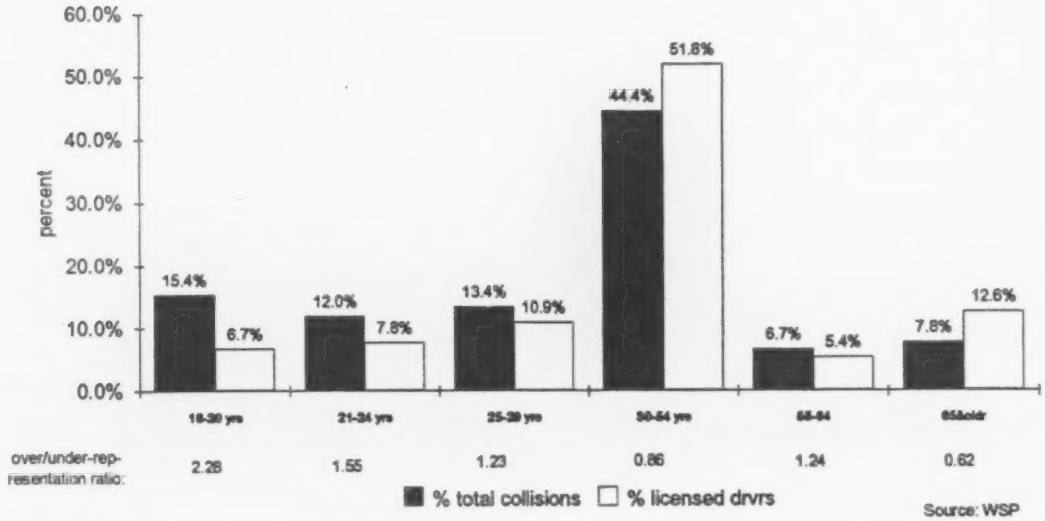


Figure 4-2: Percent of total collisions & total licensed drivers
By age groups - 1991



Youthful drivers in collisions by first harmful event

Of youthful drivers involved in collisions, 76.5% collided with other moving vehicles. This type of collision accounted for the greatest percentage of fatal crashes (38.9%) and injury collisions (74.1%). Single-vehicle collisions with fixed objects had the second highest percentage of youthful driver involvement for total, fatal and injury collisions (Table 4-2).

Table 4-2: Collisions involving youthful drivers*
By first harmful event - 1991

type of collision	fatal collisions		injury collisions		total collisions	
	#	%	#	%	#	%
Collision w/other moving motor vehicles	86	38.9%	15,495	74.1%	37,166	76.5%
Collision w/parked vehicle	2	0.9%	324	1.5%	1,547	3.2%
Collision w/fixed/other object	75	33.9%	3,070	14.7%	6,713	13.8%
Overturning & other non-collision	35	15.8%	1,331	6.4%	2,202	4.5%
Collisions w/pedestrians & pedalcyclists	23	10.4%	643	3.1%	669	1.4%
Other collisions - animal & R.R. train	0	0.0%	59	0.3%	267	0.5%
Total	221	100.0%	20,922	100.0%	48,564	100.0%

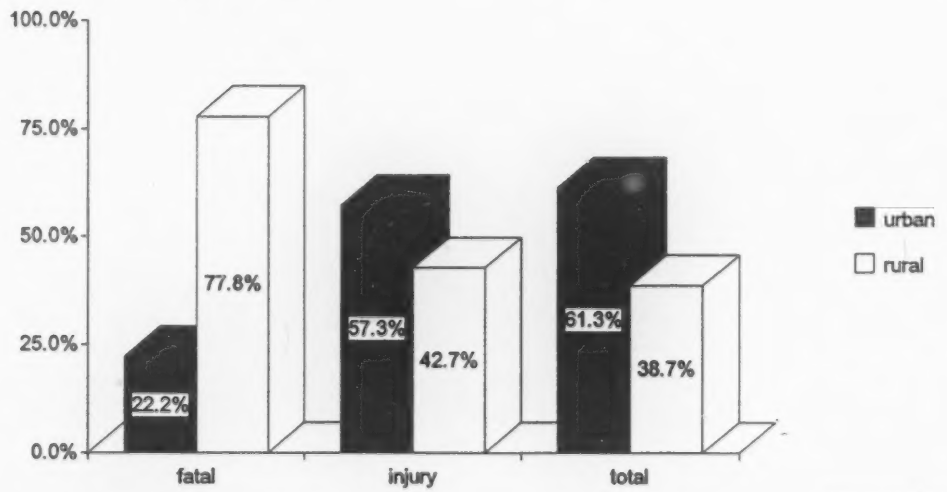
* Drivers 24 and younger

Source: WSP

Youthful driver involvement by location

In 1991, 77.8% of the fatal collisions involving youthful drivers occurred in the rural areas of the state. In injury and total reported collisions however, 57.3% of the injury collisions and 61.3% of the total reported collisions occurred in the urban areas (Figure 4-3).

Figure 4-3: **Youthful drivers* in urban & rural collisions**
By severity - 1991



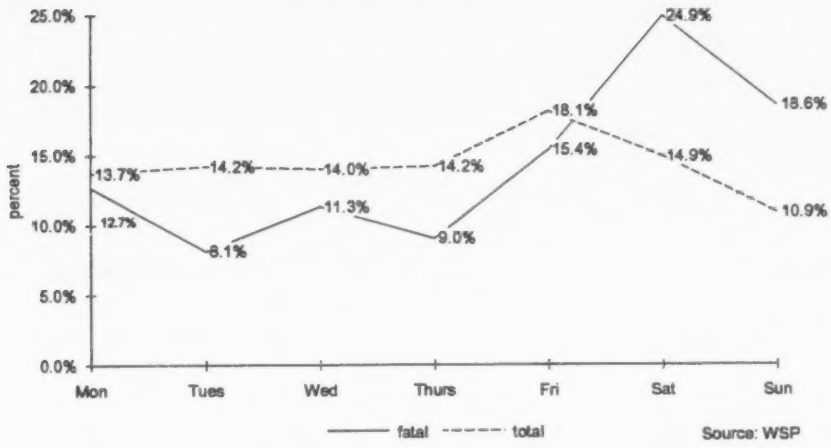
* Drivers 24 and younger

Source: WSP

Youthful drivers involvement by day of week/time of day

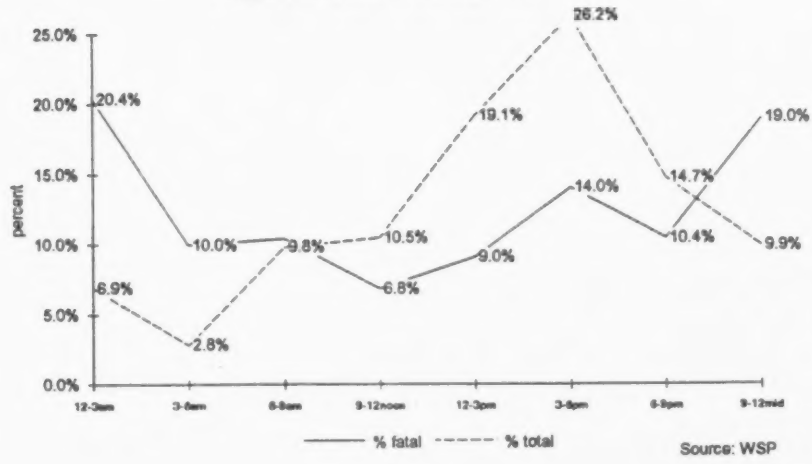
During 1991, Saturdays recorded 24.9% of all youthful fatal crashes, followed by Sundays with 18.6%. Fridays recorded the largest percentage of all reported collisions with 18.1% (Figure 4-4).

Figure 4-4: **Drivers 24 & younger in total and fatal collisions**
Percentage by day of week - 1991



Most fatal collisions involving youthful drivers occurred during the late evening and early morning hours, while the highest percentage of total collisions involving youthful drivers occurred between 3 p.m. and 6 p.m. (Figure 4-5).

Figure 4-5: **Drivers 24 & younger in total and fatal collisions**
Percentage by hour of the day - 1991



Teenage driver collisions

Twenty three thousand (23,209) teenage drivers 19 years and younger were involved in 21,646 total collisions, 89 fatal collisions and 9,267 injury collisions during 1991. The total collision rate for teenagers was computed at 129.36 collisions per 1,000 licensed drivers for 1991. This was down 16.4% from the previous four-year average rate of 154.78 (Table 4-3).

Table 4-3: Teenage driver collisions - 19 years & younger
Five-year comparison

collisions & rates	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
Total collisions	21,646	23,965	25,312	27,017	28,575	26,217	-17.4%
Teenage drivers involved	23,209	25,775	27,263	29,348	31,084	28,368	-18.2%
Fatal collisions	89	112	108	125	131	119	-25.2%
Injury collisions	9,267	10,265	10,821	11,254	11,379	10,930	-15.2%
Licensed drivers	179,409	169,377	186,237	190,610	186,587	183,203	-2.1%
Fatal to total collision ratio*	4.11	4.67	4.27	4.63	4.58	4.54	-9.4%
Fatal collision rate**	0.50	0.66	0.58	0.66	0.70	0.65	-23.7%
Total collision rate**	129.36	152.18	146.39	153.97	166.59	154.78	-16.4%

* Fatal collisions per 1,000 total collisions
** Fatal/total collisions per 1,000 licensed drivers
Source: WSP, DOL

Contributing circumstances in teenage collisions

"Speed too fast for conditions" was the leading contributing circumstance for each age group, with the exception of 17 year old drivers where it was the second leading circumstance. "Failure to yield right of way" was the leading circumstance for 17 year old drivers and second for all other ages of youthful drivers. Following too closely was the third contributor for all teenage drivers (Table 4-4).

Table 4-4: Contributing circumstances in teenage driver collisions
By age - 1991

	16 & younger		17 years		18 years		19 years		total	
contributing circumstances*	#	%	#	%	#	%	#	%	#	%
Speed--too fast for conditions	794	23.6%	903	23.4%	939	22.1%	867	20.7%	3,503	22.4%
Failure to yield right of way	750	22.3%	938	24.3%	920	21.7%	781	18.7%	3,389	21.7%
Following too closely	343	10.2%	418	10.8%	512	12.1%	528	12.6%	1,801	11.5%
Exceeding legal speed	254	7.6%	258	6.7%	275	6.5%	268	6.4%	1,055	6.7%
Disregarding traffic sig./signs	204	6.1%	231	6.0%	256	6.0%	317	7.6%	1,008	6.4%
Driving under the influence	69	2.1%	102	2.6%	183	4.3%	285	6.8%	639	4.1%
Operating defective equipment	114	3.4%	123	3.2%	161	3.8%	151	3.6%	549	3.5%
Crossing over the center line	59	1.8%	87	2.3%	102	2.4%	82	2.0%	330	2.1%
Improper passing	58	1.7%	102	2.6%	85	2.0%	81	1.9%	326	2.1%
All other circumstances+	716	21.3%	692	18.0%	815	19.2%	823	19.7%	3,046	19.5%
Total	3,361	100.0%	3,854	100.0%	4,248	100.0%	4,183	100.0%	15,646	100.0%

*Investigated collisions only
+Including driver inattention
Source: WSP

V. Senior Driver Involvement

During 1991, 27,237 senior drivers (55 years and older) were involved in 25,101 reported collisions. There were 134 fatal collisions involving 150 senior drivers and 9,823 injury collisions involving 10,691 senior drivers. These figures indicate that senior driver involvement in 1991 increased 0.8% in total collisions, increased 3.5% in injury collisions and decreased 5.7% in fatal collisions when compared to the 4-year baseline average. The number of drivers licenses issued to senior drivers (811,424) increased 5.8 % from the baseline period. The total collision rate for senior drivers (total collisions per 1,000 licensed senior drivers) was 33.57 for 1991, down 4.7% from the baseline period (Table 5-1).

Table 5-1: Senior driver (55 & older) collisions by severity
Five-year comparison

severity & rates	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
Total collisions	27,237	28,103	26,873	26,584	26,482	27,011	0.8%
Fatal collisions	150	157	174	148	157	159	-5.7%
Injury collisions	10,691	10,937	10,559	10,197	9,634	10,332	3.5%
Senior drivers licensed	811,424	781,620	780,607	763,079	741,653	766,740	5.8%
Fatal collision rate*	0.18	0.20	0.22	0.19	0.21	0.21	-10.8%
Total collision rate*	33.57	35.95	34.43	34.84	35.71	35.23	-4.7%

* Fatal/total collisions per 1,000 licensed drivers

Source: WSP, DOL

Senior driver collisions by first harmful event

Of all collisions involving senior drivers in 1991, 86.9% were with other moving vehicles. This type of collision accounted for 65.7% of fatal crashes and 85.0% of injury collisions. Single vehicle collisions with fixed or other objects led to the next highest percentages of senior driver involvement in total, injury and fatal collisions, at 5.8%, 6.6% and 15.7% respectively. Collisions with pedestrians and bicycles contributed to only 1.9% of total senior driver collisions, but resulted in 6.0% of fatal collisions and 4.7% of injury collisions (Table 5-2).

Table 5-2: Collisions involving senior drivers*
By first harmful event - 1991

type of collision	fatal collisions		injury collisions		total collisions	
	number	%	number	%	number	%
Collision w/other moving motor veh	88	65.7%	8,348	85.0%	21,807	86.9%
Collision with fixed/other object	21	15.7%	648	6.6%	1,461	5.8%
Collision with parked vehicle	0	0.0%	115	1.2%	622	2.5%
Collisions with pedestrian & bicycles	8	6.0%	459	4.7%	471	1.9%
Overturning & other non collision	14	10.4%	233	2.4%	443	1.8%
Other collisions inc. RR train, animal	3	2.2%	22	0.2%	297	1.2%
Total	134	100.0%	9,823	100.0%	25,101	100.0%

* Collisions in which one or more senior drivers involved

Source: WSP

Contributing circumstances in senior driver collisions

"Failure to yield right of way" contributed to 45.5% of all driver violations in the 75 years and older age group. This violation was the leading contributing circumstance for all drivers 55 years and older in collisions. "Speed too fast for conditions" was the second leading driver violation for senior drivers ages 55-59 and 60-64, with 15.4% and 12.7% respectively. Disregarding traffic signals/signs was the second highest violation for the 70-74 and the 75 and older groups with 10.5% and 11.6% respectively (Table 5-3).

Table 5-3: Contributing circumstances in senior driver collisions
By age group - 1991

contributing circumstances	55-59		60-64		65-69		70-74		75 & older	
	number	%	number	%	number	%	number	%	number	%
Failure to yield right of way	803	28.6%	851	34.2%	755	33.5%	879	41.9%	1,543	45.5%
Speed too fast for conditions	432	15.4%	316	12.7%	259	11.5%	178	8.5%	218	6.4%
Disregard traffic signal/signs	231	8.2%	191	7.7%	203	9.0%	220	10.5%	394	11.6%
Following too closely	328	11.7%	245	9.8%	263	11.7%	181	8.6%	251	7.4%
DWI	186	6.6%	158	6.4%	82	3.6%	57	2.7%	42	1.2%
Defective equipment	81	2.9%	61	2.5%	51	2.3%	30	1.4%	52	1.5%
Crossing over the centerline	47	1.7%	40	1.6%	41	1.8%	32	1.5%	45	1.3%
Exceeding legal speed	22	0.8%	19	0.8%	19	0.8%	15	0.7%	13	0.4%
All other circumstances+	679	24.2%	607	24.4%	578	25.7%	508	24.2%	830	24.5%
Total	2,809	100.0%	2,488	100.0%	2,251	100.0%	2,100	100.0%	3,388	100.0%

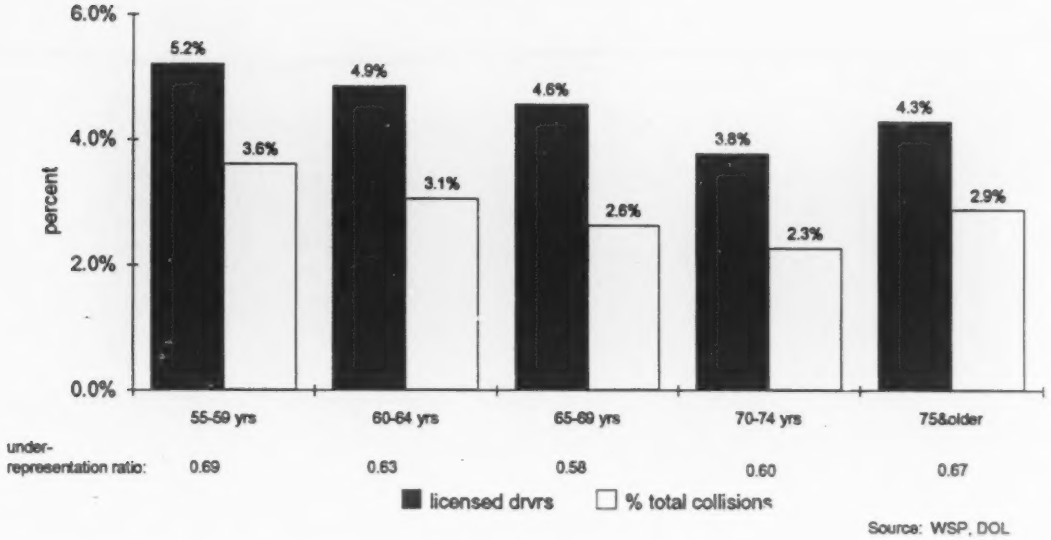
+Including driver inattention

Source: WSP

Senior driver collisions by age group

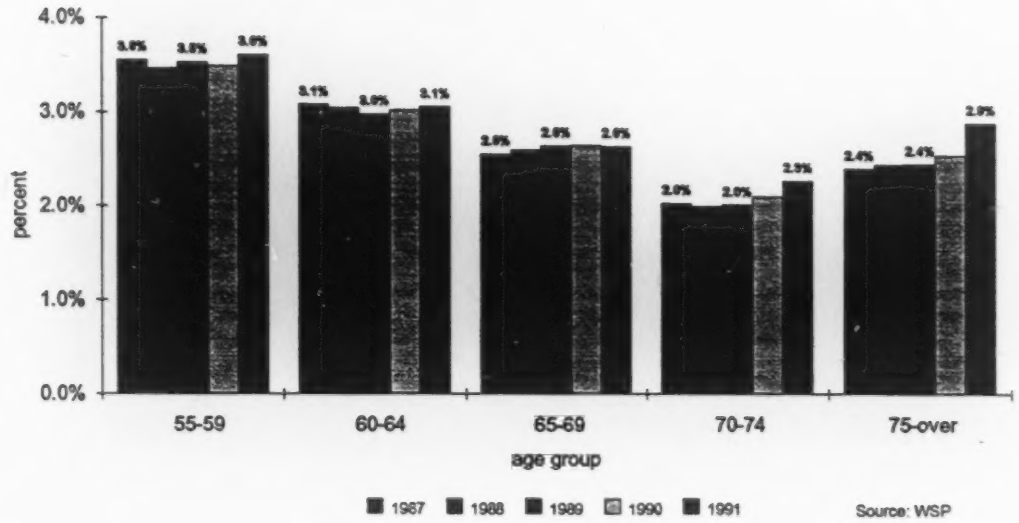
Figure 5-1 shows that each senior driver age group has been under-represented in collisions compared to their percentage of licensed drivers. To illustrate, the 55-59 age group was involved in 3.6% of reported collisions but the constitutes 5.2% of the total licensed drivers, creating a 0.69 under-representation ratio. Figure 5-2 shows percentages of all collisions by senior groups over a 5-year period.

Figure 5-1: Percentage of total collisions and licensed drivers
By senior age groups - 1991



Source: WSP, DOL

Figure 5-2: Percent of all collisions by senior age groups
Five-year trends

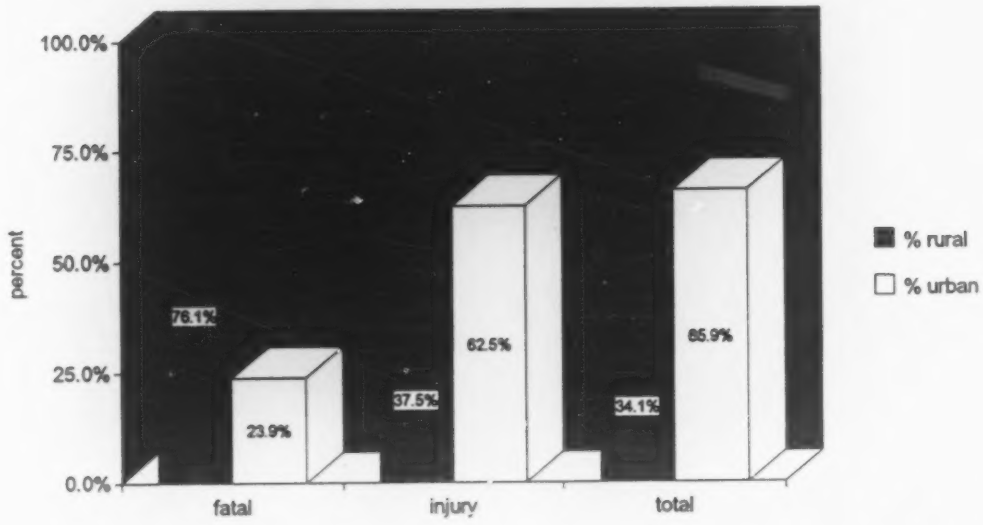


Source: WSP

Senior driver collisions by location and severity

In 1991, 65.9% of total senior driver collisions occurred in urban areas. Of senior driver injury collisions, 62.5% occurred in urban areas. Of senior driver fatal collisions, 76.1% occurred in rural areas (Figure 5-3).

Figure 5-3: **Senior drivers (age 55 and older) in collisions Rural vs urban by severity**



Senior driver collisions by day of the week/hour of day

Of all days of the week, Saturday recorded the highest senior driver involvement in fatal collisions with 21.6%. Friday was the day that experienced the highest total collisions with 18.0%. The lowest rates for both fatals and total collisions occurred on Sunday, with 8.2% for each (Figure 5-4). The greatest percentages of both fatal crashes (23.9%) and total crashes (29.0%) involving senior drivers occurred from 3:00 p.m. to 6:00 p.m. (Figure 5-5).

Figure 5-4: Senior drivers in fatal and total collisions
Percentage by day of week - 1991

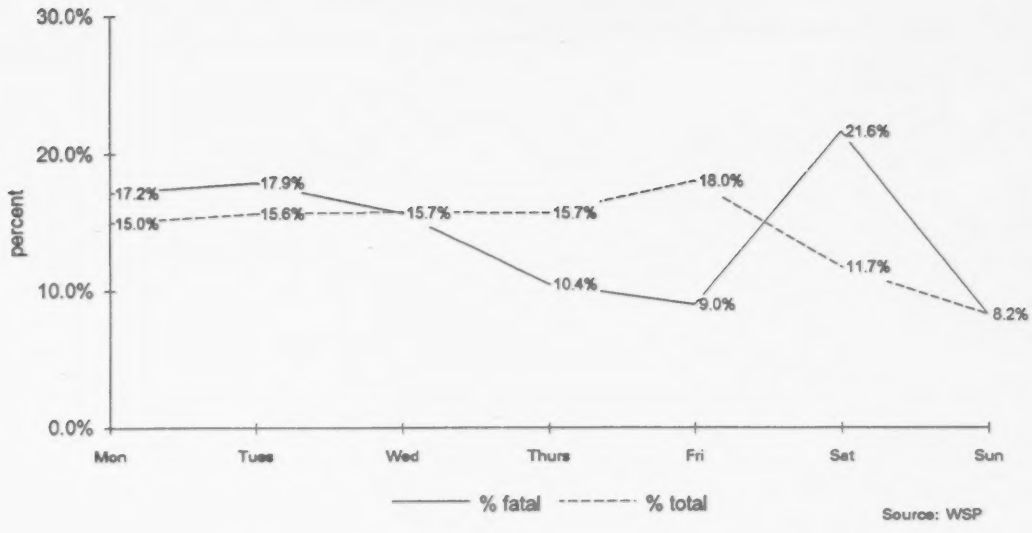
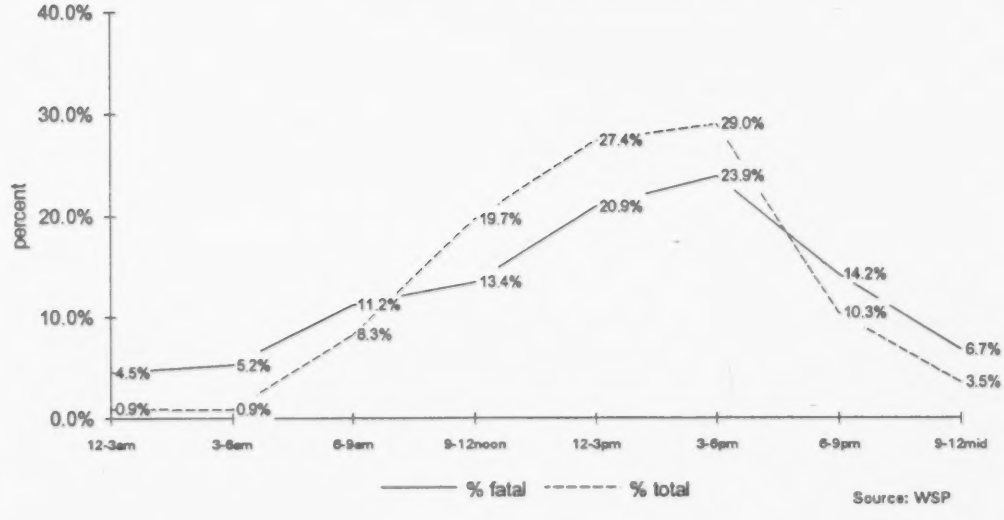


Figure 5-5: Senior drivers in fatal and total collisions
Percentage by time (three-hour intervals)



VI. Pedestrians

During 1991, 79 pedestrians were killed and 1,911 were injured in the state. This was a decrease of 17.1% in the number killed, and an increase of 3.7% in the number injured compared to the previous 4-year average. In rural areas 41 were killed compared to 38 killed in urban areas. However, many more pedestrian injuries occurred in urban areas than in rural areas, 1,456 compared to 455 in rural areas (Table 6-1).

Table 6-1: Pedestrians killed & injured in vehicle collisions
Five-year comparison

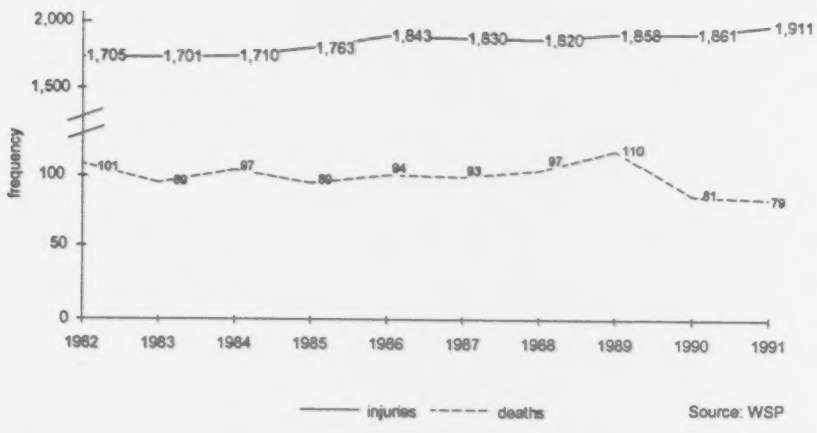
severity by area	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
Statewide collisions							
Pedestrians killed	79	81	110	97	93	95	-17.1%
Pedestrians injured	1,911	1,861	1,858	1,820	1,830	1,842	3.7%
Rural collisions							
Pedestrians killed	41	43	70	51	39	51	-19.2%
Pedestrians injured	455	463	493	497	468	480	-5.3%
Urban* collisions							
Pedestrians killed	38	38	40	46	54	45	-14.6%
Pedestrians injured	1,456	1,398	1,365	1,323	1,362	1,362	6.9%

*2,500 population and greater

Source: WSP

Pedestrian injuries have shown a gradual increase over the past ten years, with a low of 1,701 in 1983 and a high of 1,911 in 1991. There was a ten-year low in 1991 pedestrian fatalities (79) after a 10-year high of 110 in 1989 (Figure 6-1).

Figure 6-1: Pedestrian injuries and deaths
Ten-year comparison



Source: WSP

Ages of pedestrians killed and injured

The age group with the most pedestrians killed over the last five years has been the 75 and older group, followed by those 25 to 34 years old. The largest increase for any age group was the 10-14 year olds, increasing from no deaths in 1990 to 7 in 1991. The largest decrease was in the 0 to 4 year age group with 2 killed in 1991, down 65.2% from the previous 4-year average (Table 6-2).

Table 6-2: Pedestrians killed
Five-year comparison by age

age	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
0-4	2	3	5	10	5	6	-65.2%
5-9	6	7	6	4	5	6	9.1%
10-14	7	0	5	3	6	4	100.0%
15-19	8	5	13	10	7	9	-8.6%
20-24	3	5	10	3	2	5	-40.0%
25-34	11	9	19	15	14	14	-22.8%
35-44	8	7	11	12	11	10	-22.0%
45-54	5	11	10	7	11	10	-48.7%
55-64	7	6	8	7	11	8	-12.5%
65-74	9	11	5	8	7	8	16.1%
75 & Older	13	17	18	15	14	16	-18.8%
Not Stated	0	0	0	3	0	1	-100.0%
TOTAL	79	81	110	97	93	95	-17.1%

Source: WSP

Pedestrian injuries have stayed relatively constant during the past five years. The biggest increase in pedestrian injuries was in the 35-44 year age group which experienced an increase of 58 injuries from the previous year and a 26.7% increase from the previous 4-year average. Children four years and younger experienced an overall increase of 30.3% compared to the previous 4-year average (Table 6-3).

Table 6-3: Pedestrians injured in motor vehicle collisions*
Five-year comparison by age

age	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
0-4	113	75	83	97	92	87	30.3%
5-9	217	225	235	234	251	236	-8.1%
10-14	218	226	226	197	196	211	3.2%
15-19	193	203	218	190	206	204	-5.5%
20-24	186	170	185	149	166	168	11.0%
25-34	267	312	288	295	289	296	-9.8%
35-44	263	205	219	210	196	208	26.7%
45-54	121	117	95	95	108	104	16.6%
55-64	96	82	87	96	84	87	10.0%
65-74	76	80	78	74	83	79	-3.5%
75 & older	89	90	74	91	76	83	7.6%
Not stated	72	76	70	92	83	80	-10.3%
Total	1,911	1,861	1,858	1,820	1,830	1,877	-0.8%

Source: WSP

* in all traffic collisions.

Actions of pedestrians killed and injured in urban and rural areas

In urban areas, 49.6% of all pedestrians killed and injured were struck while crossing the roadway at an intersection, while 32.8% were killed or injured while crossing at a location other than at an intersection. Most pedestrians 15 years or older who were killed or injured in urban areas were crossing at an intersection. Most pedestrians under 15 years of age who were killed or injured were crossing the roadway at a location other than an intersection (Table 6-4).

Table 6-4: Actions of pedestrians killed & injured - urban areas
By age - 1991

	killed & injured								killed	
action	0-4	5-14	15-24	25-64	65+	n/stat	total	%	#	%
Crossing at intersection	17	117	128	329	106	45	742	49.6%	11	28.9%
Crossing not at intersection	59	159	77	138	45	12	490	32.8%	16	42.1%
Walking with traffic	0	4	12	6	0	0	22	1.5%	0	0.0%
Walking against traffic	1	0	5	3	0	0	9	0.6%	0	0.0%
Standing/working in roadwy	3	4	18	38	1	2	66	4.4%	3	7.9%
Playing in roadway	3	7	2	0	0	0	12	0.8%	0	0.0%
Lying in roadway	1	0	1	1	0	0	3	0.2%	1	2.6%
Not in roadway	3	13	18	40	6	0	80	5.3%	6	15.8%
Other & not stated	1	9	15	41	4	2	72	4.8%	1	2.6%
Total	88	313	276	596	162	61	1,496	100.0%	38	100.0%

Source: WSP

In rural areas, 35.1% of the pedestrians killed or injured were crossing the roadway at a location other than at an intersection. This action also resulted in 19 fatalities during 1991 (Table 6-5).

Table 6-5: Actions of pedestrians killed & injured - rural areas
By age - 1991

	killed & injured								killed	
action	0-4	5-14	15-24	25-64	65+	n/stat	total	%	#	%
Crossing at intersection	3	30	19	35	8	2	97	19.6%	2	4.9%
Crossing not at intersection	14	70	27	50	12	1	174	35.1%	19	46.3%
Walking with traffic	1	5	7	12	0	0	25	5.0%	3	7.3%
Walking against traffic	0	1	2	3	0	0	6	1.2%	2	4.9%
Standing/working in roadwy	0	4	14	21	1	4	44	8.9%	2	4.9%
Playing in roadway	5	5	2	0	0	1	13	2.6%	2	4.9%
Lying in roadway	0	1	4	1	0	0	6	1.2%	0	0.0%
Not in roadway	2	15	31	44	3	3	98	19.8%	7	17.1%
Other & not stated	2	4	9	17	1	0	33	6.7%	4	9.8%
Total	27	135	115	183	25	11	496	100.0%	41	100.0%

Source: WSP

Vehicle-pedestrian collisions in cities over 15,000

Everett had the highest pedestrian fatality rate in Washington cities with 6.90 per 100,000 population, based on 5 pedestrian deaths. Seattle had the highest pedestrian injury rate with 98.01 injuries per 100,000 population. Lynnwood had the next highest pedestrian injury rate at 96.52 and the City of Sea-Tac was third at 91.98. Seattle, Lynnwood and Sea-Tac also had the highest pedestrian collision rates with 92.59, 89.62 and 87.60 collisions per 100,000 population (Table 6-6)

Table 6-6: Pedestrian collisions by population - 1991
Cities 15,000 population & greater

		pedestrian death		pedestrian inj		total ped clsns	
city	population	number	rate*	number	rate*	number	rate*
250,000 and over							
Seattle	516,259	8	1.55	506	98.01	478	92.59
100,000 to 250,000							
Spokane	178,500	3	1.68	104	58.26	102	57.14
Tacoma	177,500	2	1.13	110	61.97	103	58.03
50,000 to 100,000							
Bellevue	87,900	0	0.00	32	36.41	30	34.13
Everett	72,480	5	6.90	53	73.12	58	80.02
Federal Way	70,660	1	1.42	32	45.29	33	46.70
Yakima	57,660	0	0.00	37	64.17	35	60.70
Bellingham	53,100	0	0.00	36	67.80	30	56.50
25,000 to 50,000							
Vancouver	47,190	0	0.00	23	48.74	19	40.26
Renton	43,000	1	2.33	18	41.86	19	44.19
Kennewick	42,773	0	0.00	10	23.38	9	21.04
Kirkland	40,590	1	2.46	15	36.95	16	39.42
Kent	39,650	2	5.04	35	88.27	31	78.18
Redmond	37,480	0	0.00	10	26.70	10	26.70
Bremerton	37,040	0	0.00	32	86.39	29	78.29
Olympia	34,850	0	0.00	26	74.61	26	74.61
Auburn	33,280	2	6.01	18	54.09	18	54.09
Richland	32,740	0	0.00	6	18.33	6	18.33
Longview	31,730	0	0.00	13	40.97	12	37.82
Edmonds	30,850	0	0.00	13	42.14	12	38.90
Lynnwood	29,010	0	0.00	28	96.52	26	89.62
Walla Walla	27,020	1	3.70	15	55.51	14	51.81
15,000 to 25,000							
Puyallup	24,450	0	0.00	8	32.72	8	32.72
Pullman	23,090	0	0.00	6	25.99	5	21.65
Sea Tac	22,830	0	0.00	21	91.98	20	87.60
Wenatchee	22,080	0	0.00	7	31.70	7	31.70
Mercer Island	21,190	0	0.00	8	37.75	8	37.75
Pasco	20,660	0	0.00	5	24.20	5	24.20
Lacey	20,210	0	0.00	5	24.74	4	19.79
Mountlake Terrace	19,690	0	0.00	9	45.71	8	40.63
Mount Vernon	18,720	0	0.00	9	48.08	7	37.39
Port Angeles	17,890	0	0.00	13	72.67	12	67.08
Oak Harbor	17,890	0	0.00	2	11.18	2	11.18
Des Moines	17,480	0	0.00	5	28.60	5	28.60
Aberdeen	16,660	1	6.00	15	90.04	12	72.03

*Frequency per 100,000 population

Source: WSP, OFM

Vehicle-pedestrian collisions in Washington counties

King County had the highest pedestrian collision rate with 53.10 collisions per 100,000 population, followed by Grays Harbor and Skamania Counties with 36.87 and 35.29 respectively. King County had the highest rate of fatalities plus injuries with 57.45 killed or injured per 100,000 population. This was followed by Skamania and Grays Harbor Counties with 47.06 and 44.55 per 100,000 population respectively (Table 6-7).

Table 6-7: Pedestrian collisions
By county - 1991

county	population	killed/inj	rate*	collisions	rate*
Over 1,000,000					
King	1,542,300	886	57.45	819	53.10
250,000 to 750,000					
Pierce	603,800	196	32.46	181	29.98
Snohomish	484,000	185	38.22	174	35.95
Spokane	366,000	136	37.16	125	34.15
100,000 to 250,000					
Clark	250,300	66	26.37	54	21.57
Kitsap	196,500	70	35.62	66	33.59
Yakima	190,500	71	37.27	65	34.12
Thurston	168,000	47	27.98	44	26.19
Whatcom	132,200	46	34.80	39	29.50
Benton	114,800	21	18.29	20	17.42
50,000 to 100,000					
Cowlitz	83,500	23	27.54	22	26.35
Skagit	82,800	23	27.78	19	22.95
Grays Harbor	65,100	29	44.55	24	36.87
Island	62,700	8	12.76	7	11.16
Lewis	60,500	10	16.53	9	14.88
Clallam	58,500	19	32.48	18	30.77
Grant	56,400	11	19.50	10	17.73
Chelan	53,200	13	24.44	13	24.44
25,000 to 50,000					
Walla Walla	49,300	17	34.48	15	30.43
Mason	39,900	6	15.04	5	12.53
Franklin	38,600	6	15.54	6	15.54
Whitman	38,500	8	20.78	7	18.18
Okanogan	34,000	7	20.59	6	17.65
Stevens	31,500	0	0.00	0	0.00
Douglas	27,500	1	3.64	1	3.64
Kittitas	27,400	6	21.90	3	10.95
10,000 to 25,000					
Jefferson	21,600	5	23.15	5	23.15
Pacific	19,200	1	5.21	1	5.21
Asotin	17,800	7	39.33	6	33.71
Klickitat	16,800	4	23.81	4	23.81
Adams	13,800	3	21.74	3	21.74
San Juan	10,700	4	37.38	3	28.04
Under 10,000					
Pend Oreille	9,200	0	0.00	0	0.00
Lincoln	8,900	1	11.24	1	11.24
Skamania	8,500	4	47.06	3	35.29
Ferry	6,500	0	0.00	0	0.00
Columbia	4,000	1	25.00	1	25.00
Wahkiakum	3,300	0	0.00	0	0.00
Garfield	2,300	0	0.00	0	0.00
Total	5,000,400	1,941	0.39	1,779	35.58

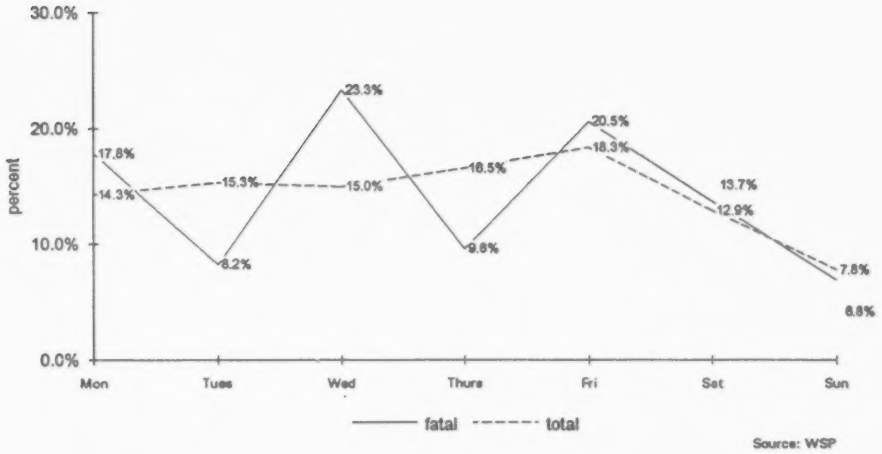
Source: WSP, OFM

* Frequency per 100,000 population

Pedestrian collisions by day of week/hour of day

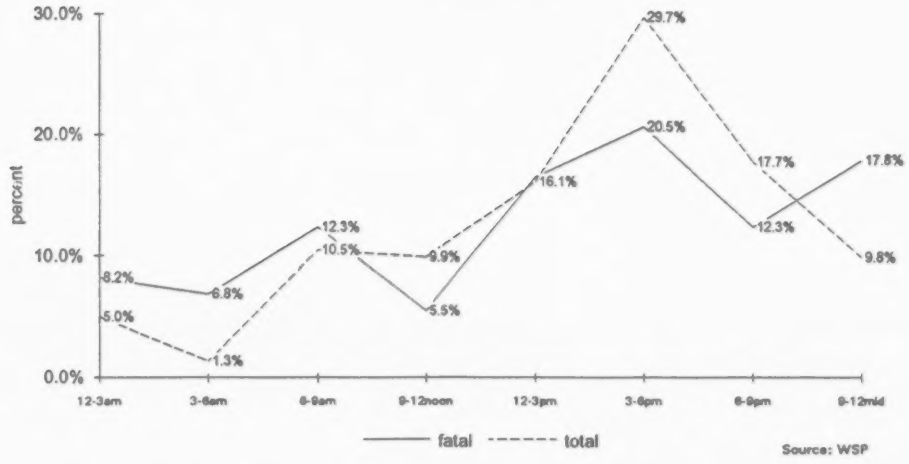
Wednesday and Friday had the highest percentages of fatal pedestrian collisions with 23.3% and 20.5% respectively. Friday and Thursday recorded the highest percentages of total pedestrian collisions with 18.3% and 16.5% respectively (Figure 6-2).

Figure 6-2: Pedestrian fatal and total collisions
Percentage by day of week



The 3-hour period from 3:00 p.m. to 6:00 p.m. had the highest percentages of both fatal and total pedestrian collisions with 20.5% and 29.7% respectively (Figure 6-3).

Figure 6-3: Pedestrian fatal and total collisions
Percentage by hour of day - 1991



VII. Pedalcycles

Total pedalcycle collisions increased 4.5% from the previous 4-year average in 1991. However, the number of pedalcyclists killed (5) was down 61.5% from the previous 4-year average. There was only one person killed in an urban area and four were killed in rural areas. The number injured increased 9.2% in urban areas and 5.7% in rural areas from the previous 4-year average (Table 7-1).

Table 7-1: Pedalcycle traffic collisions in urban & rural areas
Five-year comparison

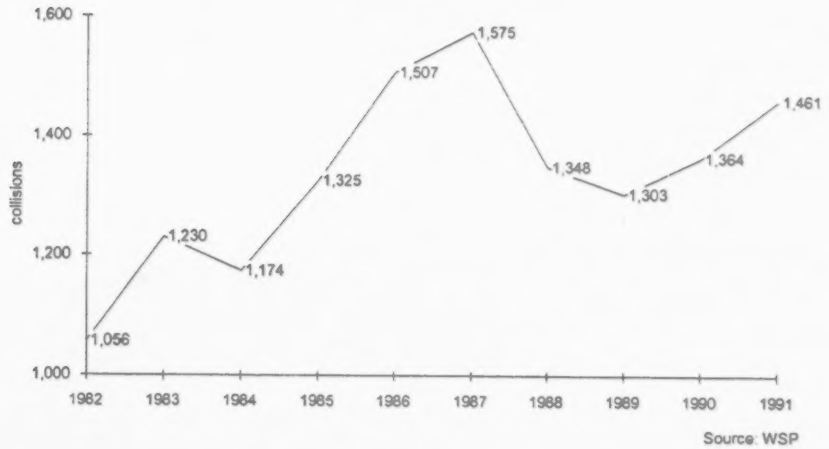
severity	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
Statewide:							
Total collisions	1,461	1,364	1,303	1,348	1,575	1,398	4.5%
Persons killed	5	14	8	12	18	13	-61.5%
Persons injured	1,476	1,362	1,331	1,375	1,584	1,413	4.5%
Rural areas:							
Total collisions	416	377	392	439	550	440	-5.3%
Persons killed	4	10	6	6	15	9	-56.8%
Persons injured	422	379	402	450	559	448	-5.7%
Urban* areas:							
Total collisions	1,045	987	911	909	1,025	958	9.1%
Persons killed	1	4	2	6	3	4	-73.3%
Persons injured	1,054	983	929	925	1,025	966	9.2%

* Population of 2,500 and greater

Source: WSP

During 1991 there were 1,461 vehicle-pedalcyclist collisions, 97 more than during the previous year. The year 1987 recorded the most vehicle-pedalcyclist collisions during the last 10 years with 1,575 (Figure 7-1).

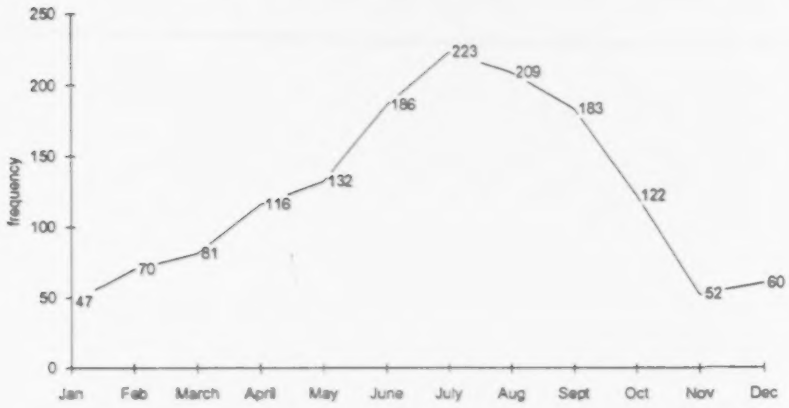
Figure 7-1: Vehicle-pedalcyclist collisions
Ten-year comparison



Source: WSP

The months of May through September accounted for 63.0% of all persons killed and injured in pedalcycle-related collisions during 1991. January recorded the least number of pedalcycle injuries with 47, and July recorded the most with 223 (Figure 7-2).

Figure 7-2: **Persons injured in pedalcycle collisions***
By month - 1991



* Includes five fatalities

Source: WSP

Ages of pedalcyclists injured

In 1991, 386 pedalcyclists between the ages of 10 to 14 were killed or injured; this was the highest frequency for any age group. The next highest age group was the 5 to 9 age group with 232 pedalcyclists injured. The 10 to 14 age group experienced a reduction of 0.5%, while the 5-9 age group recorded a slight increase from the previous 4-year average. All other age groups (0-4, and age 20 and older) show substantial increases over the previous 4-year average (Table 7-2).

Table 7-2: Pedalcyclists injured* in motor vehicle collisions
Five-year comparison by age group

age	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
0-4	32	16	14	23	23	19	68.4%
5-9	232	191	233	215	288	232	0.1%
10-14	386	381	355	368	447	388	-0.5%
15-19	181	194	215	253	304	242	-25.1%
20-24	207	163	130	155	157	151	36.9%
25-34	217	213	185	158	169	181	19.7%
35-44	97	96	69	73	64	76	28.5%
45-54	34	35	31	33	22	30	12.4%
55-64	20	18	14	18	14	16	25.0%
65-74	17	9	7	9	17	11	61.9%
75 & older	5	5	3	4	2	4	42.9%
Not stated	40	42	51	49	63	51	-22.0%
Total	1,468	1,363	1,307	1,358	1,570	1,400	4.9%

* Injuries include 5 fatal injuries in 1991, 14 in '90, 8 in '89, 12 in '88 and 18 in '87.

Source: WSP

Pedalcycle collisions in urban areas

The city of Port Angles recorded the highest pedalcycle collision rate in the state during 1991 with 106.20 collisions per 100,000 population. Tukwila was second highest in this category with 82.02 followed by Centralia with 81.90 and Olympia with 80.34 (Table 7-3).

Table 7-3: Pedalcycle collisions in urban areas
Cities 10,000 population & greater - 1991

city	population	collisions	collision rate*	fatals & injuries**	fatal&injury rate*
250,000 and over					
Seattle	516,259	275	53.27	276	53.46
100,000 to 250,000					
Spokane	178,500	107	59.94	113	63.31
Tacoma	177,500	74	41.69	79	44.51
50,000 to 100,000					
Bellevue	87,900	33	37.54	32	36.41
Everett	72,480	32	44.15	33	45.53
Federal Way	70,660	21	29.72	20	28.30
Yakima	57,660	24	41.62	24	41.62
Bellingham	53,100	22	41.43	21	39.55
25,000 to 50,000					
Vancouver	47,190	20	42.38	20	42.38
Renton	43,000	11	25.58	11	25.58
Kennewick	42,773	6	14.03	5	11.69
Kirkland	40,590	9	22.17	9	22.17
Kent	39,650	26	65.57	25	63.05
Redmond	37,460	11	29.36	11	29.36
Bremerton	37,040	14	37.80	14	37.80
Olympia	34,850	28	80.34	28	80.34
Auburn	33,280	16	48.08	17	51.08
Richland	32,740	6	18.33	6	18.33
Longview	31,730	21	66.18	20	63.03
Edmonds	30,850	7	22.69	7	22.69
Lynnwood	29,010	15	51.71	15	51.71
Walla Walla	27,020	11	40.71	10	37.01
15,000 to 25,000					
Puyallup	24,450	9	36.81	9	36.81
Pullman	23,090	7	30.32	7	30.32
Sea Tac	22,830	11	48.18	12	52.56
Wenatchee	22,080	16	72.46	17	76.99
Mercer Island	21,190	7	33.03	7	33.03
Pasco	20,660	5	24.20	5	24.20
Lacey	20,210	16	79.17	15	74.22
Mountlake Terrace	19,690	4	20.31	3	15.24
Mount Vernon	18,720	8	42.74	8	42.74
Port Angeles	17,890	19	106.20	19	106.20
Oak Harbor	17,890	3	16.77	3	16.77
Des Moines	17,480	1	5.72	1	5.72
Aberdeen	16,660	8	48.02	8	48.02
10,000 to 15,000					
Tukwila	14,630	12	82.02	12	82.02
Bothell	12,630	1	7.92	1	7.92
Ellensburg	12,570	9	71.60	9	71.60
Centralia	12,210	10	81.90	11	90.09
Kelso	11,800	7	59.32	7	59.32
Anacortes	11,700	3	25.64	3	25.64
Moses Lake	11,420	4	35.03	4	35.03
Sunnyside	11,270	1	8.87	1	8.87
Marysville	10,970	7	63.81	7	63.81
TOTAL	2,093,282	957	45.72	965	46.10

* Collisions/fatalities & injuries per 100,000 population — Source: WSP, OFM

** Includes one urban pedalcycle fatality which occurred in Spokane.

Pedalcycle collisions and injuries in unincorporated areas

The unincorporated areas of Lincoln County experienced the highest collision rate in 1991 for unincorporated areas in Washington State at 54.01 collisions per 100,00 population. This was followed by Pacific County with 31.55 and Pend Oreille with 31.37 collisions per 100,000 population. Seven counties experienced no pedalcycle collisions in 1991 (Table 7-4).

Table: 7-4: Pedalcycle collisions in unincorporated areas
By county - 1991

county	unincorp. population	collisions	collision rate*	injuries +	injury rate*
Over 100,000					
King	532,407	121	22.73	122	22.91
Pierce	354,348	55	15.52	55	15.52
Snohomish	266,157	44	16.53	47	17.66
Clark	184,980	36	19.46	37	20.00
Spokane	168,434	35	20.78	35	20.78
Kitsap	132,821	23	17.32	24	18.07
25,000 to 100,000					
Thurston	98,335	16	16.27	16	16.27
Yakima	86,881	15	17.26	15	17.26
Whatcom	62,073	7	11.28	7	11.28
Island	42,500	6	14.12	6	14.12
Skagit	39,095	5	12.79	5	12.79
Lewis	36,790	5	13.59	5	13.59
Cowlitz	34,188	7	20.48	9	26.33
Clallam	33,550	0	0.00	0	0.00
Mason	32,590	1	3.07	0	0.00
Benton	28,962	1	3.45	1	3.45
Grant	27,717	3	10.82	4	14.43
Grays Harbor	25,669	2	7.79	2	7.79
10,000 to 25,000					
Chelan	23,395	7	29.92	7	29.92
Stevens	23,111	1	4.33	1	4.33
Douglas	19,997	2	10.00	2	10.00
Okanogan	19,838	3	15.12	3	15.12
Franklin	15,500	0	0.00	0	0.00
Walla Walla	14,620	0	0.00	0	0.00
Jefferson	14,370	4	27.84	4	27.84
Pacific	12,679	4	31.55	5	39.44
Klickitat	10,940	1	9.14	1	9.14
Kittitas	10,813	1	9.25	1	9.25
Asotin	10,011	3	29.97	3	29.97
Under 10,000					
San Juan	9,140	0	0.00	0	0.00
Skamania	6,925	1	14.44	2	28.88
Adams	6,606	1	15.14	1	15.14
Whitman	6,598	1	15.16	1	15.16
Pend Oreille	6,375	2	31.37	2	31.37
Ferry	5,470	1	18.28	1	18.28
Lincoln	3,703	2	54.01	2	54.01
Wahkiakum	2,790	0	0.00	0	0.00
Columbia	1,360	0	0.00	0	0.00
Garfield	886	0	0.00	0	0.00
Total	2,412,624	416	17.24	426	17.66

Source: WSP, OFM

* Collisions/injuries per 100,000 population
\+ Includes 4 fatalities: 1 in Pierce, 1 in Snohomish, and 2 in Yakima.

Location by county of pedalcycle collisions

In 1991, Chelan County experienced the highest pedalcycle collision rate with 45.11 collisions per 100,000 population and also the highest injury rate with 46.99 pedalcyclist injuries per 100,000 population. Cowlitz County followed with rates of 44.31 for collisions and 45.51 for injuries (Table 7-5).

Table 7-5: Pedalcycle collisions and injuries+
By county - 1991

county	population	collisions	collision rate*	injuries +	injury rate*
Over 1,000,000					
King	1,542,300	561	36.37	562	36.44
250,000 to 750,000					
Pierce	603,800	157	26.00	162	26.83
Snohomish	484,000	116	23.97	119	24.59
Spokane	366,000	146	39.89	152	41.53
100,000 to 250,000					
Clark	250,300	57	22.77	58	23.17
Kitsap	196,500	41	20.87	42	21.37
Yakima	190,500	47	24.67	47	24.67
Thurston	168,000	64	38.10	63	37.50
Whatcom	132,200	34	25.72	34	25.72
Benton	114,800	14	12.20	13	11.32
50,000 to 100,000					
Cowlitz	83,500	37	44.31	38	45.51
Skagit	82,800	21	25.36	21	25.36
Grays Harbor	65,100	15	23.04	15	23.04
Island	62,700	9	14.35	9	14.35
Lewis	60,500	19	31.40	20	33.06
Clallam	58,500	21	35.90	21	35.90
Grant	56,400	8	14.18	9	15.96
Chelan	53,200	24	45.11	25	46.99
25,000 to 50,000					
Walla Walla	49,300	13	26.37	12	24.34
Mason	39,900	3	7.52	2	5.01
Franklin	38,600	5	12.95	5	12.95
Whitman	38,500	8	20.78	8	20.78
Okanogan	34,000	3	8.82	3	8.82
Stevens	31,500	1	3.17	1	3.17
Douglas	27,500	2	7.27	2	7.27
Kittitas	27,400	10	36.50	10	36.50
10,000 to 25,000					
Jefferson	21,600	4	18.52	4	18.52
Pacific	19,200	5	26.04	7	36.46
Asotin	17,800	6	33.71	6	33.71
Klickitat	16,800	2	11.90	2	11.90
Adams	13,800	2	14.49	2	14.49
San Juan	10,700	0	0.00	0	0.00
Under 10,000					
Pend Oreille	9,200	2	21.74	2	21.74
Lincoln	8,900	2	22.47	2	22.47
Skamania	8,500	1	11.76	2	23.53
Ferry	6,500	1	15.38	1	15.38
Columbia	4,000	0	0.00	0	0.00
Wahkiakum	3,300	0	0.00	0	0.00
Garfield	2,300	0	0.00	0	0.00
Total	5,000,400	1,461	17188.24	1,481	174.24

Source: WSP, OFM

* Collisions/injuries per 100,000 population

\+ Includes 5 fatalities: 1 in Pierce, 1 in Snohomish, 1 in Spokane, and 2 in Yakima.

VIII. Motorcycles

Motorcycle fatalities, injuries and collisions all decreased compared to 1990 and the previous 4-year baseline average. Motorcycle registrations decreased from 113,881 during the previous 4-year average to 100,970 in 1991, a decrease of 11.3%. The total collision rate, based on collisions per 100 registered motorcycles, was down 14.2% from the 4-year average. The total persons killed in motorcycle collisions was down from 76 for the 4-year baseline to 44 in 1991, a reduction of 42.1% (Table 8-1).

Table 8-1: Motorcycle collisions
Five-year comparison

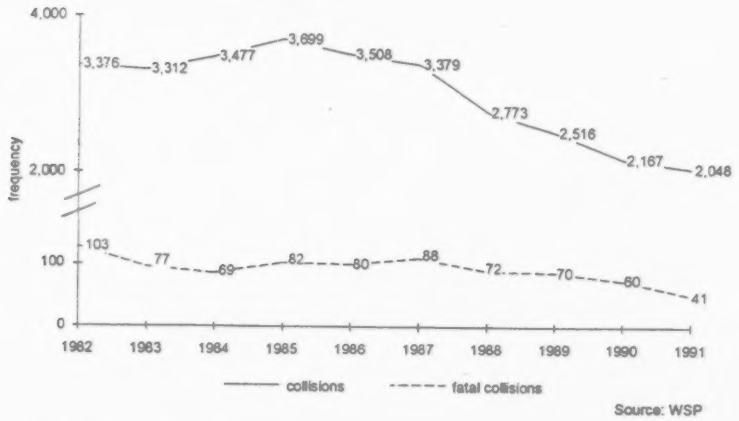
severity/exposure/rates	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
Total collisions	2,048	2,167	2,516	2,773	3,379	2,709	-24.4%
Fatal collisions	41	60	70	72	88	73	-43.4%
Fatal collision rate*	20	28	28	26	26	27	-25.5%
Motorcycle registration	100,970	103,537	110,617	117,155	124,215	113,881	-11.3%
Collision regstn rate**	2.03	2.09	2.27	2.37	2.72	2.36	-14.2%
Fatal regstn rate***	0.41	0.58	0.63	0.61	0.71	0.63	-35.9%
Total persons killed	44	62	75	77	90	76	-42.1%
Total persons injured	2,114	2,223	2,724	2,896	3,497	2,835	-25.4%
M/C drivers killed	35	55	59	66	86	67	-47.4%
M/C drivers injured	1,709	1,789	2,119	2,320	2,729	2,239	-23.7%
M/C passengers killed	8	5	10	10	3	7	14.3%
M/C passengers inj	228	272	392	383	513	390	-41.5%

*Fatal collisions per 1,000 motorcycle collisions
**Motorcycle involved per 100 registered
***Fatal collisions per 1,000 motorcycles registered

Source: WSP, DOL

Figure 8-1 compares total and fatal collisions over the 10-year period of 1982-1991. The most motorcycle collisions were recorded in 1985, with 3,699, while 1982 recorded the most fatal crashes with 103. A low of 41 fatal crashes and a low of 2,048 total collisions were recorded in 1991.

Figure 8-1: Motorcycle fatal collisions & total collisions
Ten-year comparison



Source: WSP

Table 8-2 contains a 22-year motorcycle registration and collision comparison. Motorcycle registration increased yearly from 1970 to 1981. From that point until 1991, registration declined each year (except for 1987, when it slightly increased). The number of reportable collisions followed a similar pattern, increasing from 1970 until 1979, then decreasing through 1991 (with the exception of 1984-1985). The highest motorcycle collision involvement rate (collisions per 1,000 motorcycles registered) was 30.90 recorded in 1978. That same year yielded the highest fatal collision rate at 1.03 fatal collisions per 1,000 motorcycles registered. The 1991 collision rate was the lowest of the 22-year history, at 20.28 collisions per 1,000 motorcycles registered. The 1991 fatal collision rate, 0.41, was the second lowest rate in the 22-year history.

Table 8-2: Reported motorcycle collisions
1970 to 1991

		total collisions			fatal collisions					injury collisions			
year	registered M/Cs	reportable collisions	mcyclsts involved	rate*	fatal collisions	mcyclsts involved	rate*	total fatalities	M/C killed	injury collisions	mcyclsts involved	total injuries	M/C injured
1970	62,150	1,777	1,783	28.59	44	41	0.71	46	45	1,528	1,526	N/A	N/A
1971	74,574	1,957	1,972	26.24	48	53	0.64	54	51	1,678	1,690	2,107	1,934
1972	81,200	1,893	1,937	23.31	44	48	0.54	48	43	1,654	1,691	2,076	1,932
1973	91,782	2,200	2,235	23.97	37	37	0.40	38	35	1,917	1,951	2,406	2,230
1974	110,024	2,605	2,657	23.68	57	60	0.52	60	58	2,233	2,279	2,764	2,583
1975	110,130	2,518	2,556	22.86	50	51	0.45	57	51	2,142	2,176	2,664	2,459
1976	111,211	2,761	2,807	24.83	59	61	0.53	61	61	2,364	2,404	2,978	2,752
1977+	115,454	3,093	3,230	26.79	72	79	0.62	76	75	2,716	2,770	3,432	3,230
1978	106,212	3,282	3,350	30.90	109	111	1.03	117	115	2,853	2,915	3,610	3,416
1979	129,641	3,992	4,054	30.79	116	118	0.89	121	119	3,471	3,524	4,350	4,126
1980	135,899	3,914	3,985	28.80	116	118	0.85	129	119	3,373	3,432	4,201	3,991
1981	139,931	3,727	3,796	26.63	104	106	0.74	105	101	3,186	3,245	3,920	3,752
1982	131,667	3,376	3,424	25.64	103	104	0.78	109	108	2,867	2,908	3,341	3,289
1983	127,950	3,312	3,362	25.89	77	77	0.60	77	77	2,839	2,882	3,555	3,351
1984	126,703	3,477	3,527	27.44	69	73	0.54	75	72	2,965	3,007	3,656	3,434
1985	125,224	3,699	3,762	29.54	82	84	0.65	85	82	3,139	3,190	3,884	3,632
1986	122,751	3,508	3,562	28.58	80	80	0.65	81	80	3,003	3,050	3,673	3,427
1987	124,215	3,379	3,443	27.20	88	91	0.71	90	90	2,816	2,866	3,497	3,288
1988	117,155	2,773	2,813	23.67	72	73	0.61	77	77	2,393	2,424	2,896	2,737
1989	110,617	2,516	2,557	22.75	70	72	0.63	75	69	2,171	2,208	2,724	2,511
1990@	103,537	2,167	2,198	20.93	60	61	0.58	62	60	1,840	1,865	2,223	2,061
1991	100,970	2,048	2,087	20.28	41	42	0.41	44	43	1,751	1,784	2,114	1,965

Source: WSP,DOL

*Collisions/fatal collisions per 1,000 motorcycles registered
+Repeal of the Mandatory Helmet Law effective 9/27/77
@Mandatory Helmet Law Reinstated 6/30/90

Location of motorcycle collisions

Seventeen motorcyclists were killed in 16 fatal crashes in the urban areas of the state. This was an increase of 4 fatal crashes compared to 1990, but down 6 from the previous 4-year average. Total motorcycle collisions were down 80, or 6.6%, from 1990 and down 357, or 24.1%, from the 4-year average (Table 8-3).

Table 8-3: Motorcycle collisions in urban areas
Five-year comparison

severity	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
Total collisions	1,127	1,207	1,417	1,468	1,845	1,484	-24.1%
Fatal collisions	16	12	23	25	27	22	-26.4%
Injury collisions	936	1,011	1,206	1,247	1,486	1,238	-24.4%
Property-damage-only clsns	175	184	188	196	332	225	-22.2%
Motorcyclists killed	17	12	23	27	27	22	-23.6%
Motorcyclists injured	1,024	1,106	1,376	1,313	1,679	1,369	-25.2%
All persons killed	18	13	25	28	27	23	-22.6%
All persons injured	1,107	1,188	1,485	1,481	1,821	1,494	-25.9%

Source: WSP

The rural areas of the state recorded decreases in all collision categories, 24.8%, 50.7%, and 23.7% in total, fatal and injury collisions, respectively, compared to the previous 4-year average (Table 8-4).

Table 8-4: Motorcycle collisions in rural areas
Five-year comparison

severity	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
Total collisions	921	960	1,099	1,305	1,534	1,225	-24.8%
Fatal collisions	25	48	47	47	61	51	-50.7%
Injury collisions	815	829	965	1,146	1,330	1,068	-23.7%
Property-damage-only clsns	81	83	87	112	143	106	-23.8%
Motorcyclists killed	26	48	46	49	62	51	-49.3%
Motorcyclists injured	941	955	1,135	1,330	1,563	1,246	-24.5%
All persons killed	26	49	50	49	63	53	-50.7%
All persons injured	1,007	1,035	1,239	1,415	1,676	1,341	-24.9%

Source: WSP

Table 8-5 presents 1991 motorcycle collision severity data by roadway class. Motorcycle collisions occurring on city streets recorded the highest number of injury, property damage and total collisions, and tied with county roads for the highest number of fatal collisions. Figure 8-2 shows that city streets, county roads, and, to a lesser extent, state routes, have all shown yearly reductions in motorcycle collisions over the past five years.

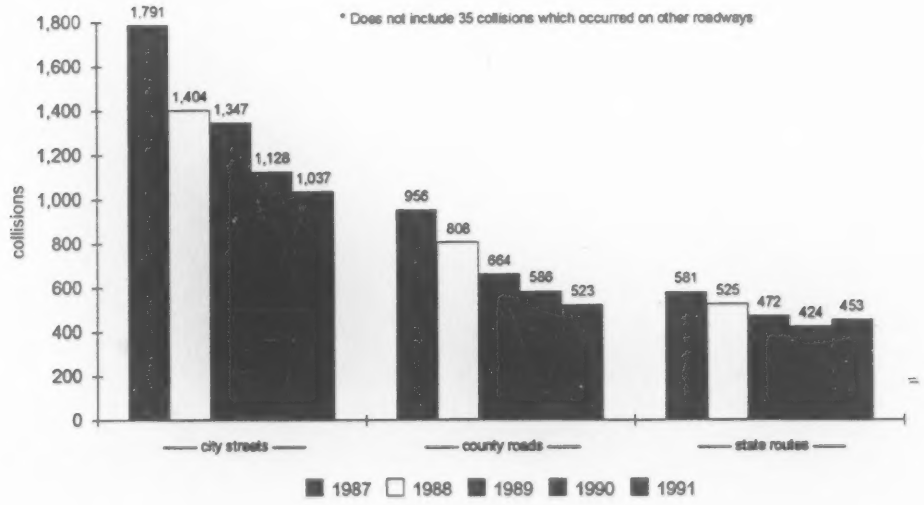
Table 8-5: Location of motorcycle collisions
By severity - 1991

	collisions				persons	
location	fatal	injury	pty dmg*	total	killed	injured
Interstate system	4	143	21	168	4	185
U.S. route no.**	4	47	4	55	4	63
State route no.**	7	204	19	230	7	264
County roads	12	467	44	523	13	560
City streets***	12	860	165	1,037	14	1,003
Other traffic ways	2	30	3	35	2	39
Total	41	1,751	256	2,048	44	2,114

*Property damage only
**Excluding city streets
***Including U.S. and state routes in cities

Source: WSP

Figure 8-2: Motorcycle collisions by road type*
Five-year comparison



First harmful event in motorcycle collisions

Most motorcyclists in collisions, 58.2%, were involved in multiple-vehicle collisions. The most prevalent, with 15% of the collisions, were rear-end collisions. Of single-vehicle collisions, overturning was the most prevalent with 27.1% (Table 8-6).

Table 8-6: Motorcyclists in traffic collisions
Single/multiple by first harmful event - 1991

type of collision	all ages	%	20/undr	21-24	25-29	30-34	35-44	45-54	55/ovr
Single motorcycle collisions									
Struck fixed object	208	10.6%	42	52	38	34	25	13	4
Struck other object	4	0.2%	0	1	0	1	2	0	0
Overturned	529	27.1%	92	102	87	58	114	48	28
Motorcycle-pedestrian	12	0.6%	2	1	5	1	3	0	0
Motorcycle-pedalcyclist	7	0.4%	1	0	1	2	1	1	1
Motorcycle-animal	44	2.3%	4	8	7	2	15	6	2
Non-collision	12	0.6%	1	2	3	3	2	0	1
Total single motorcycle	816	41.8%	142	166	141	101	162	68	36
Multiple vehicle clsns (w/mc)									
Head-on	21	1.1%	7	4	2	3	3	1	1
Rear-end	294	15.0%	62	64	37	41	59	20	11
Sideswipe	109	5.6%	16	16	26	19	20	11	1
Angular direction	267	13.7%	61	56	48	34	41	20	7
Enter/leave driveway	238	12.2%	42	38	46	32	51	21	8
One left/one straight-opp dir	209	10.7%	44	42	28	28	44	19	4
Total multiple vehicle	1,138	58.2%	232	220	187	157	218	92	32
Total motorcycle collisions *	1,954	100.0%	374	386	328	258	380	160	68

Source: WSP

* Does not include 81 where drivers age not stated.

Collision involvement by age group

The age 20 and younger motorcyclists were over-represented in 1991 collisions as shown in Figure 8-3. The 16-20 age group was involved in 19.1% of total collisions but they comprised only 1.2% of licensed drivers, creating an over-representation ratio of 15.6. The 21 to 24 age group was over-represented by a factor of 4.5. Table 8-7 shows a more detailed age breakdown.

Figure 8-3: Motorcycle drivers in collisions by age group
Collisions vs licensed drivers - 1991

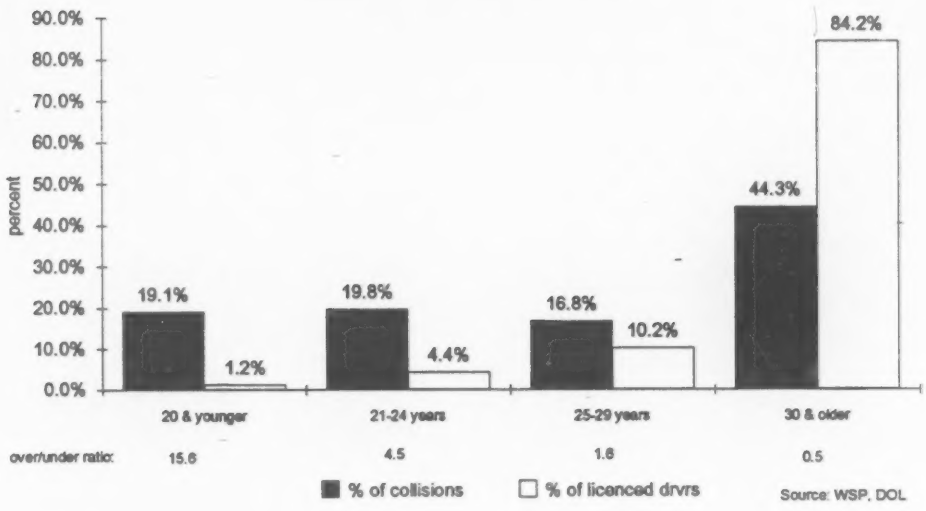


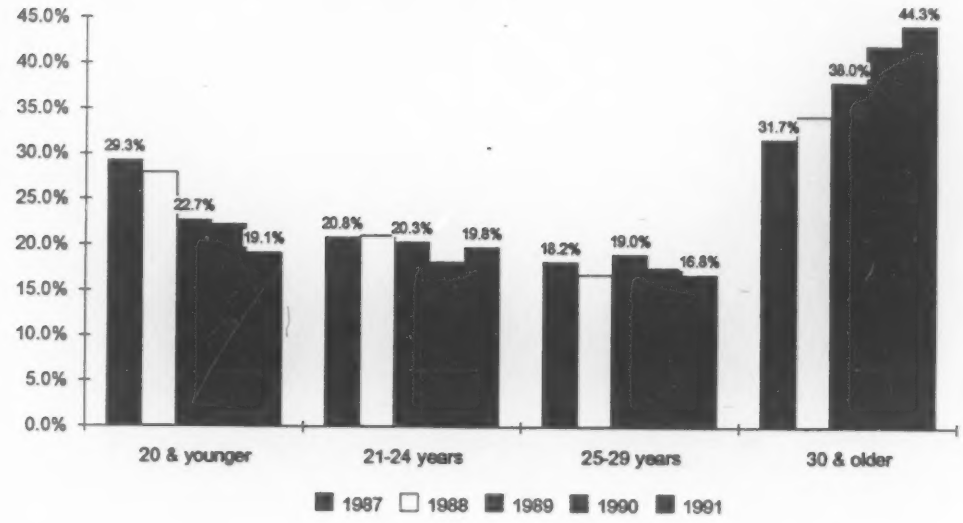
Table 8-7: Motorcycle drivers in collisions
By age group - 1991

age	dvrs in fatal clsns number	%	dvrs in inj clsns number	%	dvrs in totl clsns number	%	%-licensed M/cyclists	ovr/undr ratio-ttl clsns
Under 16	0	0.0%	46	2.7%	48	2.5%	0.00%	------
16	0	0.0%	19	1.1%	20	1.0%	0.02%	55.34
17-18	2	4.8%	87	5.0%	97	5.0%	0.29%	17.30
19-20	3	7.1%	174	10.1%	209	10.7%	0.92%	11.64
21-22	6	14.3%	181	10.5%	213	10.9%	1.88%	5.80
23-24	3	7.1%	154	8.9%	173	8.9%	2.48%	3.56
25-29	10	23.8%	287	16.6%	328	16.8%	10.18%	1.65
30-34	4	9.5%	237	13.7%	258	13.2%	16.96%	0.78
35-39	4	9.5%	190	11.0%	214	11.0%	21.26%	0.52
40-44	5	11.9%	149	8.6%	166	8.5%	17.19%	0.49
45-54	3	7.1%	142	8.2%	160	8.2%	18.06%	0.45
55-64	1	2.4%	48	2.8%	56	2.9%	7.44%	0.38
65/over	1	2.4%	10	0.6%	12	0.6%	3.32%	0.19

Source: WSP, DOL

Figure 8-4 shows a 5-year trend of motorcyclist collisions by various age groups. The percentage of total collisions by motorcyclists between the ages of 21 and 29 has remained fairly constant over the past five years. Younger motorcyclists (20 and younger) have demonstrated a drop in percentage of total collisions over the past five years, from 29.3% in 1987 to 19.1% in 1991. Motorcyclists 30 and older have shown increases over the last five years, from 31.7% to 44.3% of total collisions.

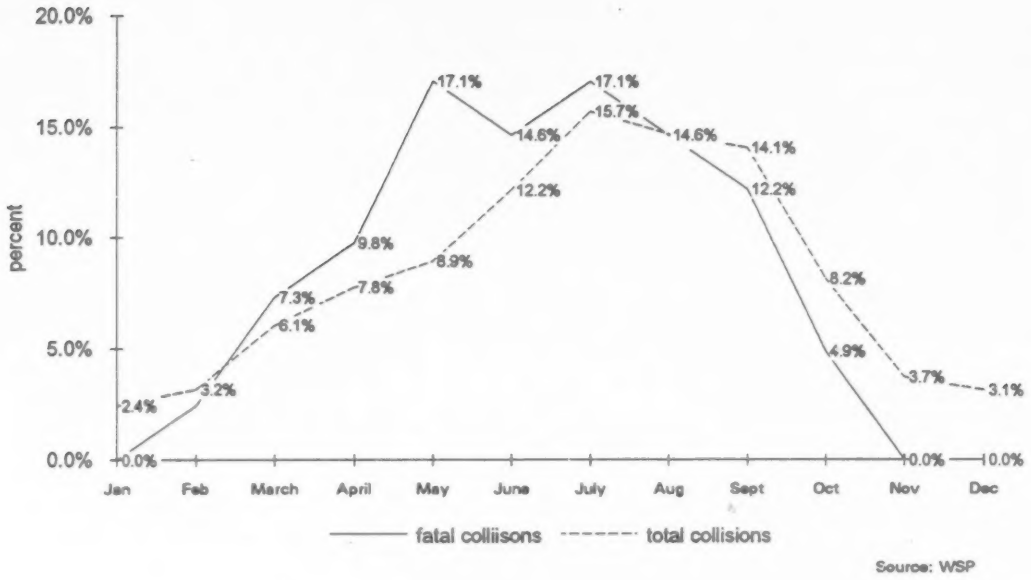
Figure 8-4: Percent of total motorcycle collisions by age groups
Five-year trends



Motorcycle collisions by month, day and hour

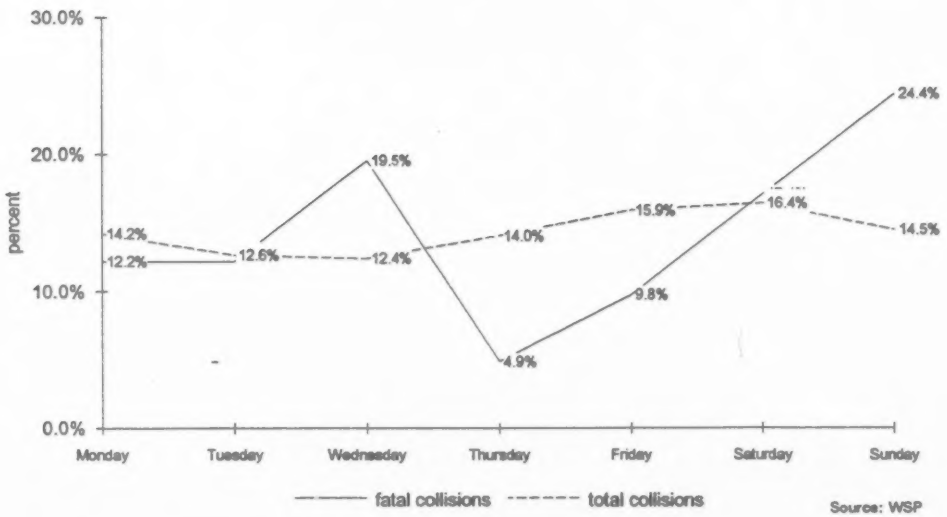
The months of May and July recorded the greatest percentage of fatal motorcycle collisions in 1991 with 17.1% each, followed by June and August with 14.6% each (Figure 8-5). Sundays recorded 24.4% of all fatal crashes, and Wednesday recorded 19.5%. The weekend days of Friday, Saturday and Sunday contributed the largest percentage of motorcycle total collisions (Figure 8-6).

Figure 8-5: Motorcycle fatal collisions and total collisions
Percentage by month - 1991



Source: WSP

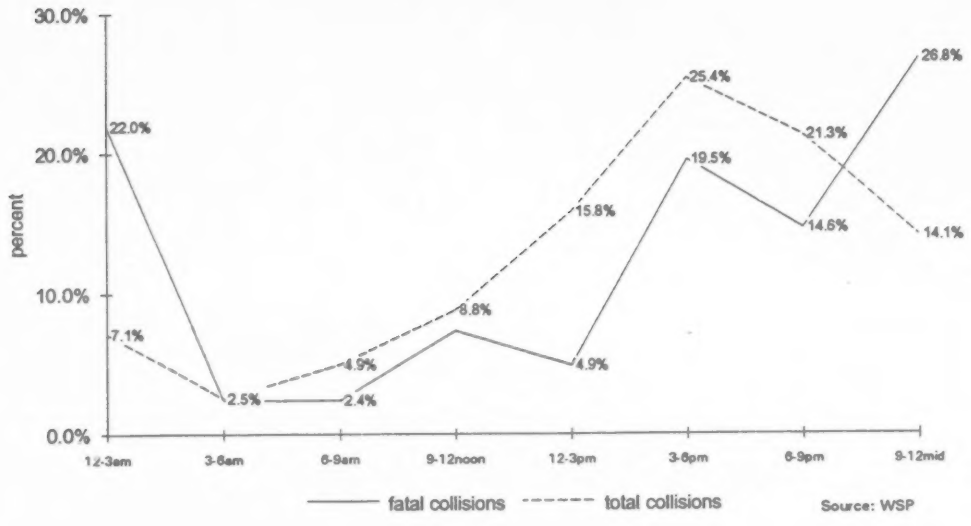
Figure 8-6: Motorcycle fatal collisions and total collisions
Percentage by day of week - 1991



Source: WSP

The three-hour period of 9:00 p.m. to midnight contributed 26.8% of fatal motorcycle crashes, followed by the period from 12 midnight to 3:00 a.m. recording 22.0%. Total motorcycle collisions peaked at the 3:00 to 6:00 p.m. period, followed by 6:00 to 9:00 p.m. with 25.4% and 21.3% respectively (Figure 8-7).

Figure 8-7: Motorcycle fatal collisions and total collisions
Percentage by hour of the day - 1991



Contributing circumstances in motorcycle collisions

Table 8-8 reveals that "speed too fast for conditions" was the leading contributing factor (26.7%) in motorcycle collisions. Driving while "under the influence" was the second leading cause, contributing to 16.1% of the total. Other leading violations were "speed over legal" with 11.9%, and "following too closely" with 6.6%.

Table 8-8: Motorcyclist violations in investigated collisions
By age - 1991

violation	all ages	%	20/undr	21-24	25-29	30-34	35-44	45-54	55/ovr	n/statd
Speed - conditions	392	26.7%	94	79	50	61	62	24	9	13
Speed - over legal	175	11.9%	52	58	35	14	14	0	0	2
Failed to yield	80	5.4%	29	6	10	7	10	11	4	3
D.W.I.	236	16.1%	25	38	60	49	48	14	2	0
Following too closely	97	6.6%	23	24	9	10	16	11	4	0
Improper passing	78	5.3%	16	13	17	12	10	5	1	4
Defective equipment	78	5.3%	23	16	5	9	16	5	3	1
Disregd signs/signals	49	3.3%	10	9	10	4	11	0	0	5
Over center line	38	2.6%	7	12	10	3	3	1	2	0
Other violations	245	16.7%	46	47	38	21	43	20	14	16
Total	1,468	100.0%	325	302	244	190	233	91	39	44

Source: WSP

IX. Heavy Trucks

In 1991, there were 5,811 heavy trucks (10,000 pound gross weight and over) involved in traffic collisions, down 8.7% from the previous 4-year average. Registration of heavy trucks was up 11.5%. The heavy truck collision rate (collisions per 10,000 registered heavy trucks) was 476.0, down 18.1% from the 4-year average (Table 9-1).

Table 9-1: Heavy trucks (10,000 lbs & greater) in collisions
Five-year comparison

severity/exposure & rates	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
Total trucks in collisions	5,811	6,725	6,345	6,149	6,243	6,366	-8.7%
Trucks in fatal collisions	59	81	79	79	71	78	-23.9%
Trucks registered*	122,084	115,500	112,000	106,400	104,200	109,525	11.5%
Total collision rate**	476.0	582.3	566.5	577.9	599.1	581.5	-18.1%
Fatal collision rate**	4.8	7.0	7.1	7.4	6.8	7.1	-31.7%

* Estimated by DOT and DOL
**Collisions per 10,000 registered trucks
Source: WSP, DOL, DOT

Heavy truck collisions by first harmful event

Heavy trucks were involved in 4,236 collisions involving other moving motor vehicles. This figure represents 75.4% of all heavy truck collisions in 1991. In addition, heavy trucks were involved in 358 collisions in which the other vehicle was parked, and in 548 collisions with fixed or other objects. There were 298 collisions in which a truck overturned. All collision types were down from the previous 4-year average (Table 9-2).

Table 9-2: Heavy truck collisions by first harmful event
Five-year comparison

type of collision	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
Clsn w/other moving motor veh	4,236	4,769	4,728	4,388	4,595	4,620	-8.3%
Collision with fixed/other object	548	755	667	677	636	684	-19.9%
Collision with parked vehicle	358	423	412	353	440	407	-12.0%
Overturning	298	321	379	349	379	357	-16.5%
Other non-collision	103	139	113	105	107	116	-11.2%
All other collisions*	74	79	75	70	86	78	-4.5%
Total	5,617	6,486	6,374	5,942	6,243	6,261	-10.3%

* Pedestrians, pedalcyclists, RR train & animal.
Source: WSP

Heavy truck defects

Defective brakes were present in 39.4% of the 444 trucks determined to have defective equipment in investigated collisions. Worn or smooth tires contributed 9.0% of total defects, tire punctures or blowouts were 5.0% of the total, defective rear lights were 3.0%, defective steering mechanisms were 2.5%, and all other defects were 40.8%. Overall, there has been a 23.3% decrease in the number of defects reported in investigated collisions over the past several years (Table 9-3).

Table 9-3: Defects of heavy trucks in collisions
Five-year comparison

condition of vehicle	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
Defective brakes	175	210	206	236	254	227	-22.7%
Worn or smooth tires	40	60	57	74	79	68	-40.7%
Defective rear lights	13	26	27	37	27	29	-55.6%
Puncture or blowout	22	26	14	24	23	22	1.1%
Defective steering	11	19	18	32	30	25	-55.6%
Defective headlights	2	4	6	6	6	6	-63.6%
Other defects	181	185	233	175	222	204	-11.2%
Total	444	530	561	584	641	579	-23.3%

Source: WSP

Age of drivers involved in heavy truck collisions

In 1991 heavy truck collisions, 55.8% of the drivers were 39 years of age or under. This group made up 36.8% of all classified drivers, creating an over-representation ratio of 1.52. The age group 40 years and over contributed 44.2% of heavy truck collisions and made up 63.1% of drivers with a classified license, creating a .70 under-representation ratio (Table 9-4).

Table 9-4: Drivers in heavy truck collisions by age
And number of classified drivers - 1991

	drivers	fatal collisions		injury collisions		all collisions		
age	% *	number	%	number	%	number	%	ratio +
19 & under	0.01%	0	0.0%	19	1.2%	60	1.2%	134.06
20-29	9.0%	8	13.6%	379	23.9%	1,179	23.0%	2.55
30-39	27.8%	22	37.3%	501	31.5%	1,622	31.6%	1.14
40-49	28.3%	13	22.0%	385	24.2%	1,268	24.7%	0.87
50-59	17.0%	12	20.3%	215	13.5%	744	14.5%	0.85
60 & over	17.8%	4	6.8%	90	5.7%	255	5.0%	0.28
Total	100.0%	59	100.0%	1,589	100.0%	5,128	100.0%	

Source: WSP, DOL

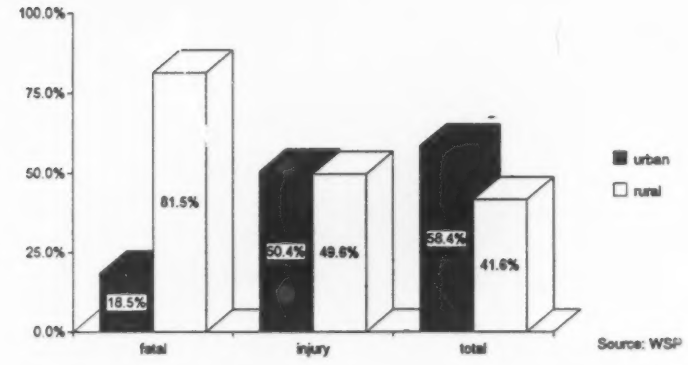
* Percent of WA drivers in age group with classified endorsement
(Required only for operators of larger trucks & truck combinations)
\+ Percent of collision involvement to percent of licensed drivers

Location of heavy truck collisions

During 1991, 81.5% of fatal heavy truck collisions occurred in rural areas. Injury collisions during 1991 were almost equally divided between urban and rural. Of the total numbers of collisions, 58.4% occurred in urban areas (Figure 9-1).

Figure 9-1:

Heavy truck collisions
Percentage of urban vs rural by severity - 1991



Heavy truck collisions by date of week/hour of day

Of all days of the week, Fridays recorded the most heavy truck collisions with 18.9%, followed by Monday with 18.6%. Saturday and Sunday had dramatically lower percentages with 5.9% and 3.2% respectively (Figure 9-2). The peak heavy truck collision period during 1991 was from noon to 3:00 p.m. The peak fatal time period was from 6:00 to 9:00 p.m. (Figure 9-3).

Figure 9-2:

Heavy trucks in fatal and total collisions
Percent by day of week - 1991

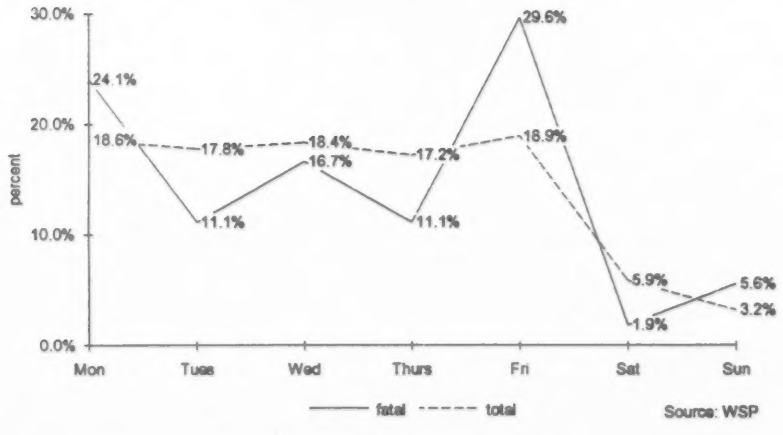
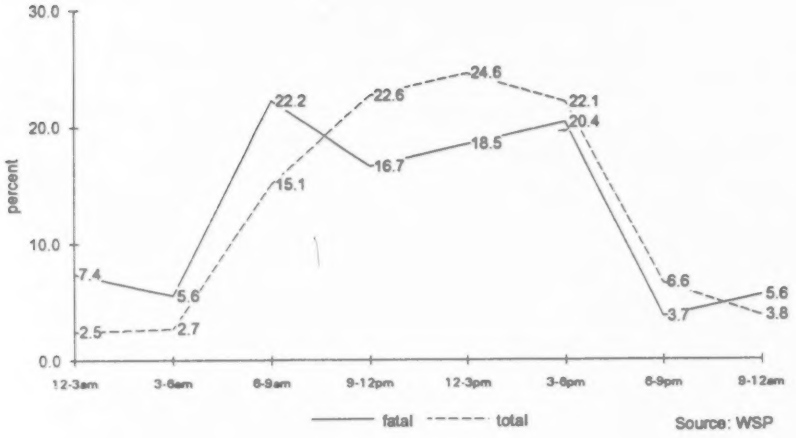


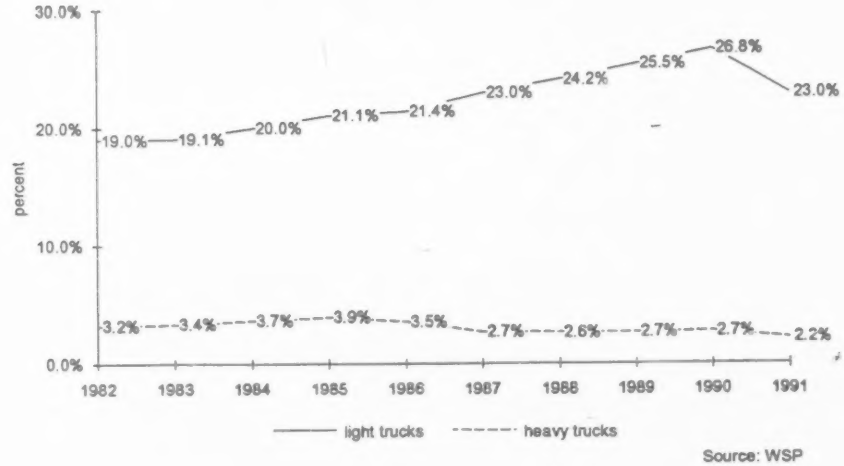
Figure 9-3: Heavy trucks in fatal and total collisions
Percentage by time (3-hour intervals) - 1991



Light and heavy truck collisions

Figure 9-4 shows percentages of the total number of 1991 Washington collisions that involved light trucks (gross weight of under 10,000 pounds) and heavy trucks over the 10-year period 1982 to 1991. Light trucks showed a steady increase from 1982 (19.0%) until 1990 (26.8%), and then decreased to 23.0% in 1991. Heavy trucks have varied from a high of 3.9% of all collisions in 1985 to a low of 2.2% in 1991.

Figure 9-4: Percentage of light and heavy trucks in total collisions
Ten-year comparison



X. Pupil Transportation

During the 1990-1991 school year, there were 340 school bus collisions reported in which 99 school bus occupants were injured. Of the 99 school bus occupants injured, 82 were pupils, 16 were drivers and 1 was an occupant other than a student. Two pedestrian/bicyclists and 2 occupants of other vehicles were killed in 1990-1991 school bus collisions. No school bus occupants have been killed during any of the last five school years (Table 10-1).

School bus registration totalled 7,113 vehicles in 1990-1991. Total school-bus travel was computed at 83 million miles during the school year, an increase of 4,932.6 million miles over the previous year (Table 10-1).

Table 10-1: Collisions involving school buses
Five-year comparison

Severity, exposure & rates	90-91	89-90	88-89	87-88	86-87	prev 4-yr avg	90-91 vs prev 4-yr avg
Total collisions	340	325	371	311	310	329	3.3%
Fatal collisions	4	1	1	1	5	2	100.0%
Injury collisions	92	98	121	115	92	107	-13.6%
Property damage collisions	244	226	249	195	213	221	10.5%
Total persons killed	4	1	1	1	5	2	100.0%
Pupils	0	0	0	0	0	0	0.0%
School bus drivers	0	0	0	0	0	0	0.0%
Other occupants of school bus	0	0	0	0	0	0	0.0%
Pedestrian/bicyclist	2	1	0	1	1	1	166.7%
Occupants/other vehicles involved	2	0	1	0	4	1	60.0%
Total persons injured	189	232	216	268	169	221	-14.6%
Pupils	82	85	66	116	59	82	0.6%
School bus drivers	16	17	21	28	9	19	-14.7%
Other occupants of school bus	1	1	1	0	1	1	33.3%
Pedestrian/bicyclist	4	6	5	7	7	6	-36.0%
Occupants/other vehicles involved	86	123	123	117	93	114	-24.6%
Total school bus pupil injuries	77	82	41				
Major injury	1	6	1				
Minor injury	6	27	11				
Possible injury	70	49	29				
School bus registration	7,113	6,906	6,627	6,427	6,185	6,536	8.8%
Registration collision rate*	47.8	47.1	56.0	48.4	50.1	50.4	-5.1%
Miles traveled (in thousands)	83,060.5	78,127.9	73,799.7	72,816.2	68,658.8	73,350.7	13.2%
Mileage collision rate**	0.41	0.42	0.50	0.43	0.45	0.45	-8.9%

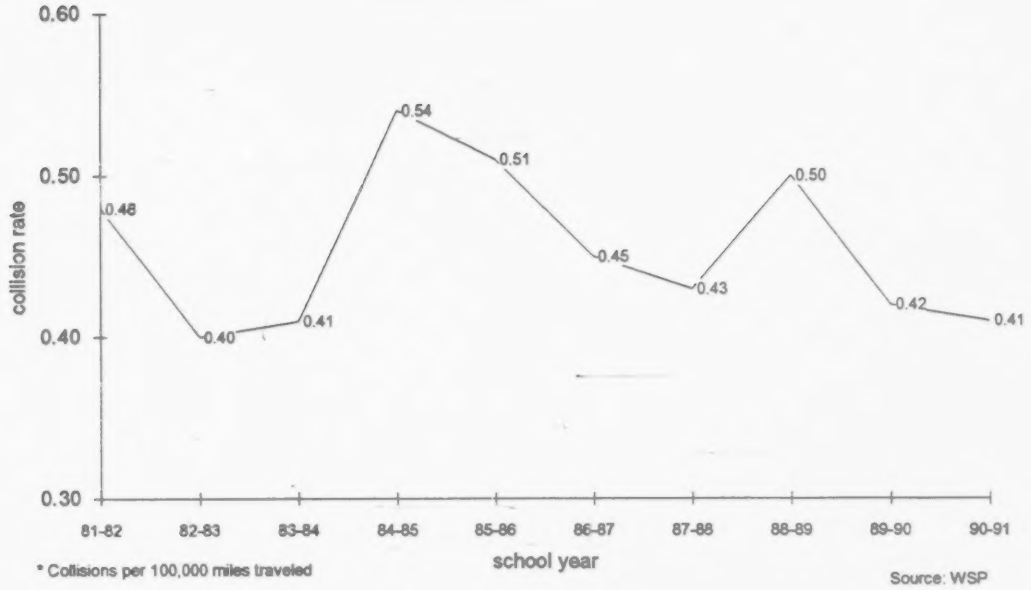
* Collisions per 1,000 registered vehicles
** Collisions per 100,000 miles traveled

Note: shaded area data not available

Source: WSP, SPI

The school bus collision rate for the 1990-1991 school year was computed at 0.41 collisions per 100,000 miles traveled. There appears to be a downward trend starting in the 84-85 school year (Figure 10-1).

Figure 10-1: **School bus collision rate* by school year**
Ten-year comparison



* Collisions per 100,000 miles traveled

Source: WSP

XI. Vehicle Defects

Of all vehicles involved in investigated collisions in 1991, the most common defect was worn or smooth tires, a defect found in 1,497 collisions. This was closely followed by defective brakes found in 1,485 collisions. These numbers represent decreases of 36.9% and 17.2% respectively in those catagories compared to the previous 4-year average (Table 11-1).

Table 11-1: Vehicle condition in investigated collisions
Five-year comparison

description	1991	1990	1989	1988	1987	prev 4-yr avg	'91 vs prev 4-yr avg
Worn or smooth tires	1,497	1,948	2,165	2,577	2,806	2,374	-36.9%
Defective brakes	1,485	1,682	1,871	1,859	1,961	1,793	-17.2%
Puncture or blowout	309	399	405	442	469	429	-27.9%
Defective rear lights	283	305	387	423	331	362	-21.7%
Defective steering	196	272	279	306	339	299	-34.4%
Defective headlights	121	112	164	156	144	144	-16.0%
Other lights/reflectors	71	97	114	106	116	108	-34.4%
All other defects	1,539	1,501	1,971	1,683	2,082	1,809	-14.9%
Total defects	5,501	6,316	7,156	7,552	8,248	7,318	-24.8%
No defects noted	159,398	170,881	161,829	164,102	161,595	164,602	-3.2%

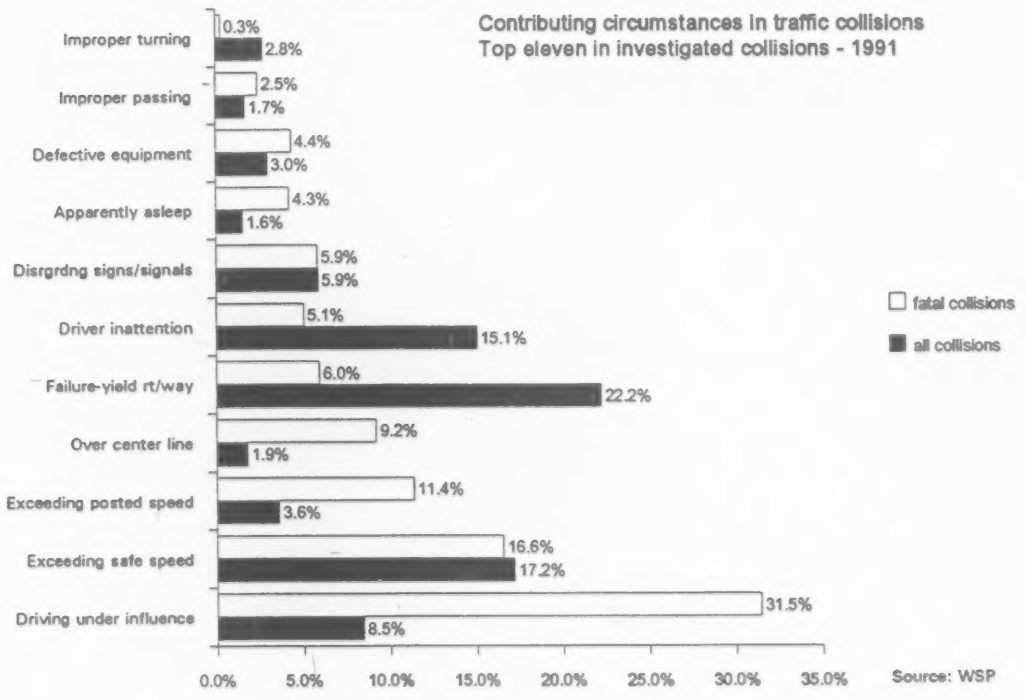
Source: WSP

XII. Contributing Driver Violations

Percentages of contributing driver violations for fatal and total collisions in 1991 are shown in Figure 12-1. For fatal collisions, "driving under the influence" was the highest factor, appearing in 31.5% of the cases. The next most prevalent contributing driver violations in fatal collisions were "exceeding safe speed" with 16.6%, and "exceeding posted speed" with 11.4%.

In all collisions, the highest percentage of contributing circumstances was "failure to yield the right of way," with 22.2%. The next highest were "exceeding safe speed" with 17.2% and "driver inattention" with 15.1%. These percentages are based on investigated collisions where contributing driver violations were noted (Figure 12-1).

Figure 12-1:



Appendix

Data Summary and Problem Analysis

GLOSSARY

Collisions

Collision - A crash involving one or more motor vehicles on a trafficway which results in personal injury or death, or damage to any one person's property to an apparent extent of $500 or more.

Fatal collision - A traffic collision where one or more persons are killed or die within 30 days as a result of the collision.

Investigated collision - A collision that has been investigated by a law enforcement officer. Data relating to alcohol involvement, contributing circumstances (driver violations), vehicle defects and safety-restraint use are collected from investigated collisions.

Injury classes

Fatal injury / fatality - A motor-vehicle, traffic-related injury that results in death. (There can be more than one "fatality" in a single "fatal collision.")

Disabling / incapacitating injury - An injury other than fatal that prevents the injured person from continuing normal activities.

Non-disabling / non-incapacitating / evident injury - Any injury not disabling but evident to others at the scene.

Possible injury - Any injury reported or claimed which is not a fatal, disabling, or non-disabling injury but includes momentary unconsciousness, limping, complaint of pain, nausea or hysteria.

Death/injury rates

Vehicle miles traveled - Traffic deaths/injuries per 100 million vehicle miles of travel (travel is estimated by WSDOT).

Registered vehicles - Traffic deaths/injuries per 10,000 registered vehicles.

Population - Traffic deaths/injuries per 10,000 population.

Calculations of economic loss

The calculable costs of motor vehicle collisions are wage loss, medical expense, insurance administration costs, and property damage. Costs are figured per person for deaths and injuries and per crash for property damage only collisions. In 1991, the National Safety Council estimated the average costs as follows:

• Death	$410,000
• Disabling injury	$ 38,200
• Non-disabling injury	$ 8,900
• Possible injury	$ 2,900
• Property damage only	$ 3,500

Appendix

Persons Involved in Collisions (Status)

Occupant - Any person who is part of a motor vehicle in transport including drivers and occupants.

Driver - An occupant who is in actual physical control of a motor vehicle in transport.

Passenger - Any occupant of a motor vehicle other than the driver.

Pedalcyclist - Any occupant of a pedalcycle in transport, including bicycles and tricycles; not including motor-driven cycles.

Pedestrian - Any person who is not an occupant or a pedalcyclist.

Senior driver - Drivers 55 years and older.

Youthful driver - Drivers 24 years of age and younger.

Location

Urban area - Incorporated areas with population of 2,500 or greater.

Rural area - Unincorporated or incorporated areas with population less than 2,500.

Trafficway - Any public roadway or highway used for motor vehicle travel.

Alcohol Involvement

DWI / driving while intoxicated - Driving while under the influence of alcohol (BAC of .10 and over) and/or when the investigating officer determines that the driver's driving ability was impaired by alcohol.

DUI / driving under the influence - Same as DWI/driving while intoxicated.

HBD / had been drinking - The investigating officer has determined that the driver had consumed some amount of alcohol and/or BAC test results greater than zero.

Vehicles

Motorcycle - Does not include mopeds or motorized bicycles

Heavy truck - 10,000 pound gross weight and higher

Light truck - Under 10,000 pounds gross weight

State Agency Abbreviations

DOL	Department of Licensing
OAC	Office of the Administrator for the Courts
OFM	Office of Financial Management
SPI	Superintendent of Public Instruction
WSP	Washington State Patrol
WSDOT	Washington State Department of Transportation
WTSC	Washington Traffic Safety Commission

Milestones in Washington Traffic Safety

1967:	Creation of Washington Traffic Safety Commission. Mandatory motorcycle helmet law.
1968:	Implied consent law.
1971:	Habitual traffic offender law.
1973:	Speed limit reduced to 55 mph.
1975:	Negligent homicide statute. Deferred prosecution statute.
1977:	Property damage reporting threshold raised to $300 from $100. Motorcycle helmet law repealed.
1979:	DWI law modified to make .10% BAC illegal per se. Mandatory day in jail for first DWI offense.
1980:	Fatality reporting threshold changed from one year to 90 days from date of collision.
1982:	"Day in Jail" changed to mean 24 consecutive hours. Alcohol assessment and education/treatment required for DWI.
1983:	Vehicular homicide and assault statute. Open container law for alcoholic beverages. Mandatory child restraint law.
1984:	Mandatory child restraint law became chargeable traffic violation. License confiscated, temporary license issued at time of DWI arrest.
1986:	Mandatory seat belt law.
1987:	Mandatory seat belt law became a chargeable traffic violation. Speed limit increased to 65 mph (60 mph for trucks) on rural interstate highways. Motorcycle Helmets required for persons under 18 years of age. Children under 5 years of age prohibited from riding on motorcycles. Property damage reporting threshold raised to $500 from $300.
1988:	Vehicle registration cancelation for driving with a suspended drivers license.
1989:	Fatality reporting threshold changed from 90 days to 30 days from date of collision. Youth under 19 years lose license for DWI for 90 days or until age 19 (whichever is longer).
1990:	Mandatory insurance required. Mandatory motorcycle helmet law.

Traffic Safety Resource Material*

Accident Facts
National Safety Council
Statistics Department (Chicago, Illinois).
444 N. Michigan Ave, Chicago, IL 60611
+ Includes one section on motor vehicle traffic collisions.

Annual Traffic Report
Washington State Department of Transportation
Planning, Research and Public Transportation Programs.
Transportation Building, P.O. Box 47372, Olympia, WA 98504-7372
+ Contains traffic volumes on state highways.

Caseloads of the Courts of Limited Jurisdiction of Washington
Office of the Administrator for the Courts
1206 S. Quince St., P.O. Box 41170, Olympia, WA 98504-1170
+ Includes DWI citation and disposition information.

Crime Trends in Washington Jurisdictions
Washington Association of Sheriffs and Police Chiefs (WASPC)
P.O. Box 826, Olympia, WA 98507
+ Includes some statistics on DWI arrests.

Fatal Accident Reporting System
National Highway Traffic Safety Administration (NHTSA)
U.S. Department of Transportation (USDOT).
National Transportation Systems Center, DTS-44
Kendall Square, Campbridge, MA 02142
+ Statistics on nationwide traffic fatalities.

Population Trends for Washington State
Office of Financial Management (OFM), Forcasting Division.
300 Insurance Building, P.O. Box 43113, Olympia, WA 98504-3113

Washington State Highway Accident Report
Washington State Department of Transportation
Planning, Research and Public Transportation Division.
Transportation Building, P.O. Box 47372, Olympia, WA 98504-7372
Olympia, WA 98504-5201
+ Accident rates for state highway sections.

Washington State Reportable Motor Vehicle Traffic Collision Statistics
Washington State Patrol
Accident Records Section
4242 Martin Way, P.O. Box 42628, Olympia, WA 98504-2628

* Documents listed are updated annually.

The Counties of Washington State